JANUARY, 1957

A McGRAW-HILL PUBLICATION

PRICE 35 CENTS

# the NEW FOOD ENGINEERING

## FE Gives Executives 6 NEW VALUES

NEW ▶ **TRENDS AND FORECASTS**
Taking the pulse of the industry's business

NEW ▶ **DEVELOPMENTS TO WATCH**
Highlighting innovations of special significance

NEW ▶ **CREATING THE PACKAGE**
Case-histories of outstanding food package development

NEW ▶ **SERVICE CENTER**
Centralized buyers' information section

NEW ▶ **VITALIZED MAKEUP**
Continuous flow of editorial material for faster reading

NEW ▶ **TWO CONTENTS PAGES**
The better to guide your editorial reading

PLUS ▶ **THREE-SPEED READING**
1. Highlights. 2. Story in nutshell. 3. Facts in detail

**FREEZER REPORT . . . Page 101**
Latest innovations revealed, other units described, in fast round-up. At left is Birds Eye freezing line.

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to help the Food Industry produce better products

1

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Most complete line of Vitamins, U.S.P., Vanillin, U.S.P., Certified F.D.&C. Colors. Any quantity—when you want them—where you want them. Quick delivery from branches in 11 cities covering the United States and Canada.

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FOOD ENGINEERING

JANUARY 1957

VOL 29 NO. 1

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Hydraulic pump eliminates extra engine, cuts maintenance, and improves performance.

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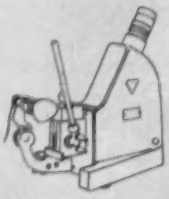
**ABBE-3L REFRACTOMETER**
Just LOAD-LIGHT-LOOK; top-accuracy readings to .0005, estimates to .0001 . . . in seconds!



**INDUSTRIAL REFRACTOMETER**
Laboratory accuracy on production lines; choice of 7 scale ranges; accurate to ± .0001.

**BUTYRO REFRACTOMETER**
Easy horizontal loading; fast readings to 0.1 Butyro number.

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Identifies samples whose indexes are close together; accurate to .00003.

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**HAND REFRACTOMETER**
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**OIL GRADING REFRACTOMETER**
Direct readings of flaxseed, soybean samples to nearest ⅓ iodine-number unit; estimates to 1/10.

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Refractometer

**DEPENDABLE QUALITY CONTROL**
Index accuracy to .00003 . . . assures identification of samples whose indexes are very close together. Tests transparent or opaque samples, liquid or solid, by transmitted or reflected light. Three readily interchangeable prism assemblies cover range of 1.20 to 1.70. Special test prism available, certified by U. S. Bureau of Standards.

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☐ Dipping ☐ Juice ☐ Hand ☐ Oil Grading
☐ I would like a demonstration of the B&L Refractometers checked above.

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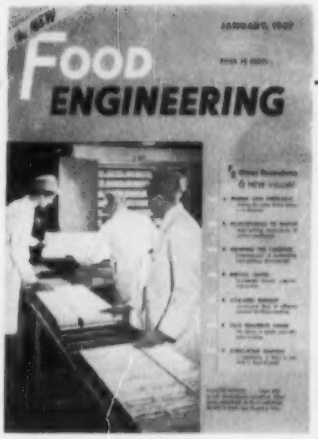



## Your New FE . . .

**. . . an enriched product in a more convenient package.**

It is more nutritious, because it contains additional ingredients of information. And the meat to which you are accustomed still is there.

More digestible, for you can quickly and painlessly assimilate key ideas and facts.

More stimulating, because information on business trends and technical innovations are served with a punch.

More convenient, the contents being easier to get at in the new package. Easy use is promoted, too, by better directions on the label—as you will have seen in these contents pages.

And its re-use value is as great as ever, for you can come back to it many times for additional servings.

### Surprises . . .

You are in for some delightful surprises as you savor the different ingredients in the package . . . the new pages that quickly up-date you on what's happening and about to happen . . . the page that gives you ideas and technical facts to help you with those packaging problems . . . the convenient fast-reading arrangement of editorial and advertising pages . . . the articles that don't turn to the back of the book . . . the handy grouping of buyers' information in the Service Center.

### . . . and Prizes

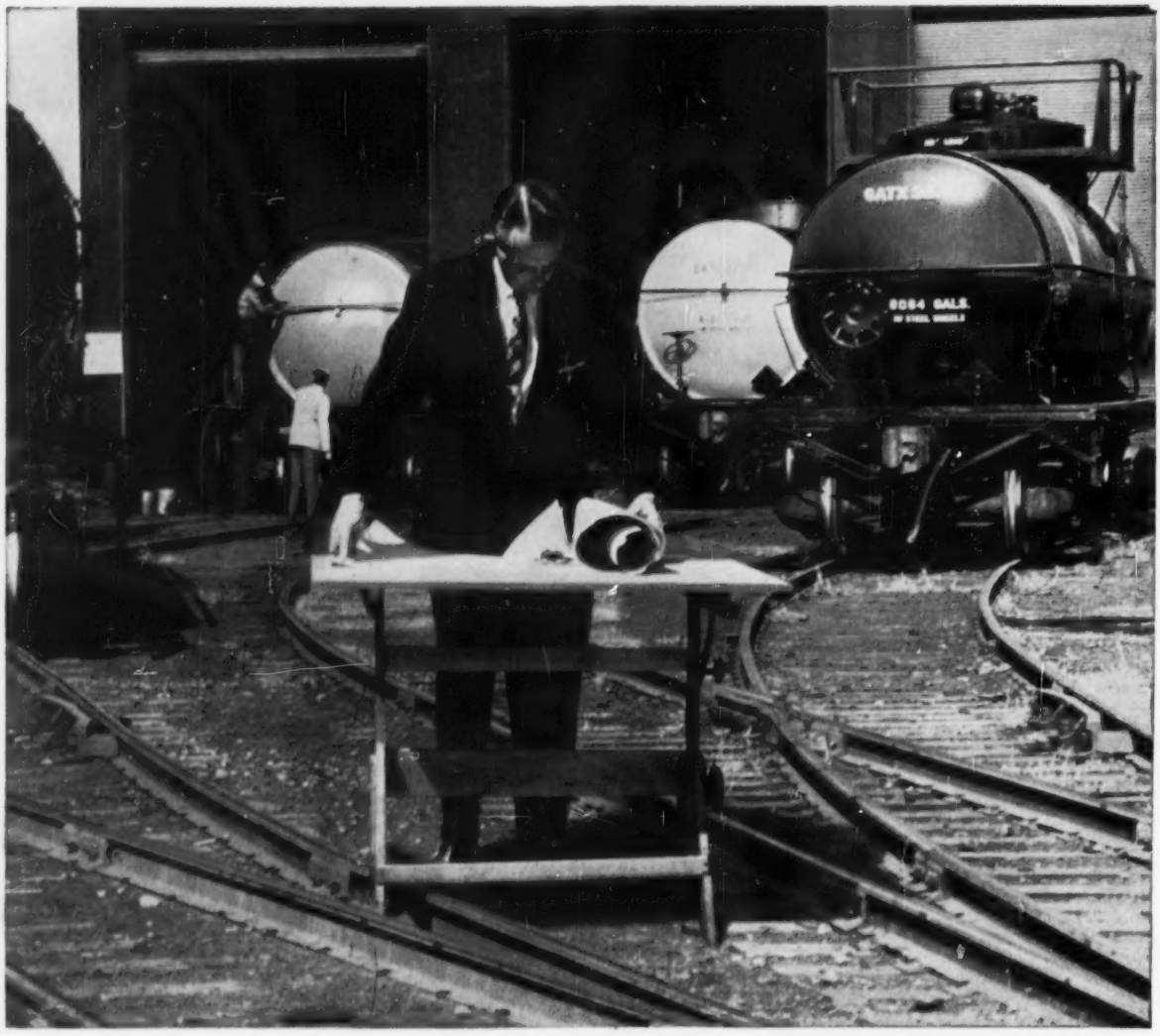
In this issue you also get two premiums:

1. A special round-up report on freezers, including units just announced. (We shudder to think what this cost in editorial time and travel.)

2. Another working-size engineering calculation chart, to cut out and use.

—The Editors

PS—Your comments on this issue will be appreciated. It is you that we are trying to please.



## What does an engineer do for GATX?

Engineering a special-purpose tank car is a job for experts. Stress, mobility, center of gravity, corrosion resistance—these are a few of the factors to be considered. At General American you'll find engineering specialists—men who pioneered with aluminum tank cars. These made possible bulk shipments of hard-to-handle liquids. You'll find men who developed the first flued-dome tank car, the first all-welded underframes, the first half-oval heater coils—and a long list of additional improvements.

This engineering skill and experience that make such developments possible is part of every GATX lease—a lease that provides shippers with the most dependable service available for bulk liquid transportation. When you lease cars from General American, you avoid the need for capital investment as well as operating, servicing and maintenance problems.

If you'd like additional information concerning the advantages of a GATX lease, call or write your nearby General American District Office.

*It Pays to Plan With General American*

GENERAL SERVICE CARS ALUMINUM CARS PRESSURE CARS INSULATED CARS

GATX GENERAL AMERICAN TRADE MARK

**GENERAL AMERICAN TRANSPORTATION CORPORATION**

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*Service Offices In Principal Cities*
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# TRENDS & FORECASTS

Special

FOOD ENGINEERING

Service to Executives

**Business never looked better** in food manufacturing and processing. Total food sales were expected to exceed $70 billion in 1956, a 5% gain. The increase represents physical volume, because prices were stable.

**Further gain of at least 5% is forecast** for the coming year, with food sales expected to exceed $100 billion by 1965. Better living through better eating has become a trend.

**Profits earned by food manufacturers** have gradually improved in the past two years, and a study of 29 leading firms revealed a 9% increase in net income for the first 9 months of 1956.

**In value added by manufacture,** the food industry's $13½ billion ranks next to the top among all industries, the just-released Census of Manufactures data for 1954 reveal. The industry is first in number of plants (42,443), second in employees (1,652,000).

**Bigger and fewer is the trend in numbers** of food plants. Total number decreased 11¼% between the '47 and '54 censuses. But there was a 25% increase in plants with 100 or more employees.

**Bellwether of prosperity,** capital expenditures by all business are heading for stability at a high level, preliminary results of a McGraw-Hill survey reveal. No downturn is in sight in the biggest and longest capital spending boom in history. Most companies plan to increase spending in 1957 and to maintain this high level in 1958.

**Capital expenditures by food and beverage** manufacturers is forecast at a 6% higher level in 1957—or $848 million, compared to an estimated $798 million for the past year. Excluding beverages, the increase is 8%.

### Overall Outlook Good

Consumer demand for food in '57 is forecast as "very strong" by USDA's Agricultural Marketing Service. High-level employment and incomes are counted upon to further increase purchases of more expensive foods. Prices likely will be above last year's level for the first 4 or 5 months. And marketing margins are expected to be slightly higher.

With large stocks and average growing weather, supplies of most foods are expected to continue large throughout 1957, but a little less than in 1956.

Some shifts in the pattern of food consumption are indicated. Civilians likely will consume a little more per person of chicken meat, fresh oranges and tangerines, frozen concentrated orange juice, and processed vegetables this year. Small reductions are foreseen for meat—but consumption should be higher than in any year from 1909 to 1954.

About the same quantity of food is expected to be exported this year as last, with rice and dry peas gaining, butter and dry beans losing volume.

Military requirements should be about the same this year.

### Baking Turns Upward

American Bakers Assn. tells FE that the tonnage index of bread and other yeast-raised products averaged 3% higher in '56 than in '55. This com-

"individually engineered"

TO TAKE HARD KNOCKS

"Individually Engineered" Furnane Floors are a new concept in corrosion-proof floor installation . . . a patented method of floor construction designed specifically for each type of food processing operation.

An integral part of this concept is the use of 6x6x1 3/8" tile, a new size pioneered by Atlas. No one thickness of floor can withstand all the varying physical and corrosive conditions found within the Food Industry.

Now, for the first time, a complete range of floor sizes are available to meet greater temperature fluctuations and physical abuse while providing the traditional 6x6" floor pattern. These sizes combined with the well known and respected principles of Furnane Floor Construction satisfy the most stringent demands.

See the "Yellow Pages" of the directory for your local representative.

*For complete information, write for your copy of "Food Floor Facts."*

ATLAS MINERAL PRODUCTS COMPANY
MERTZTOWN, PENNSYLVANIA

pares to a population increase of 1.7%.

December index was at 115, compared to '47's 100. That amounts to a gain of 60 million lb. per week—or 20 to 25% of total industry production. Industry feeling is that trend will continue.

The tonnage index for cake (primarily packaged) has improved sharply in recent months. Average for the past 7 months, through November, was 113. But November index hit 121, five points above same period last year.

Cake bakers feel packaged cake market will continue to improve in '57.

### Frozen Foods Boom

National Assn. of Frozen Food Packers finds business booming.

"All major packs were up in 1956. The year's total is going well over 5 billion lb. for the first time in history, representing a big gain over 1955's total pack of about 4¼ billion lb.

"There's no indication of a drop in 1957, no fear about moving larger packs.

"The average unit price in 1957 will be about the same, or lower, than in 1956. But we look for an increased variety of specialty items, and these generally bear higher price tags than the staples.

"Frozen packaged meat cuts caught on in 1956, and will be well worth watching—could really spurt in 1957."

### Canning to Gain in '57

Continued strong demand for canned foods, with increased per capita consumption in 1957, is expected by National Canners Assn.

Preliminary estimates are for a '57 pack of 680 million cases—up 50 million from '56.

Greatest percentage gain is expected in canned vegetables—smaller rises in canned meat and poultry, specialties, fish, and shellfish. A moderate decline is anticipated in canned fruit juices, and no change in canned fruits.

Prices will be slightly higher in the first half of 1957 over year-ago levels.

### Sees Record Milk Business

Milk Industry Foundation forecasts that "milk production will be up by 2 billion lb. or more over 1956. Total production (at an estimated 129 billion lb.)—as well as production per cow—will set new records.

"An all-time record income for dairy farmers is expected—topping the previous high of $4.6 billion in '52.

"Overall milk consumption will be


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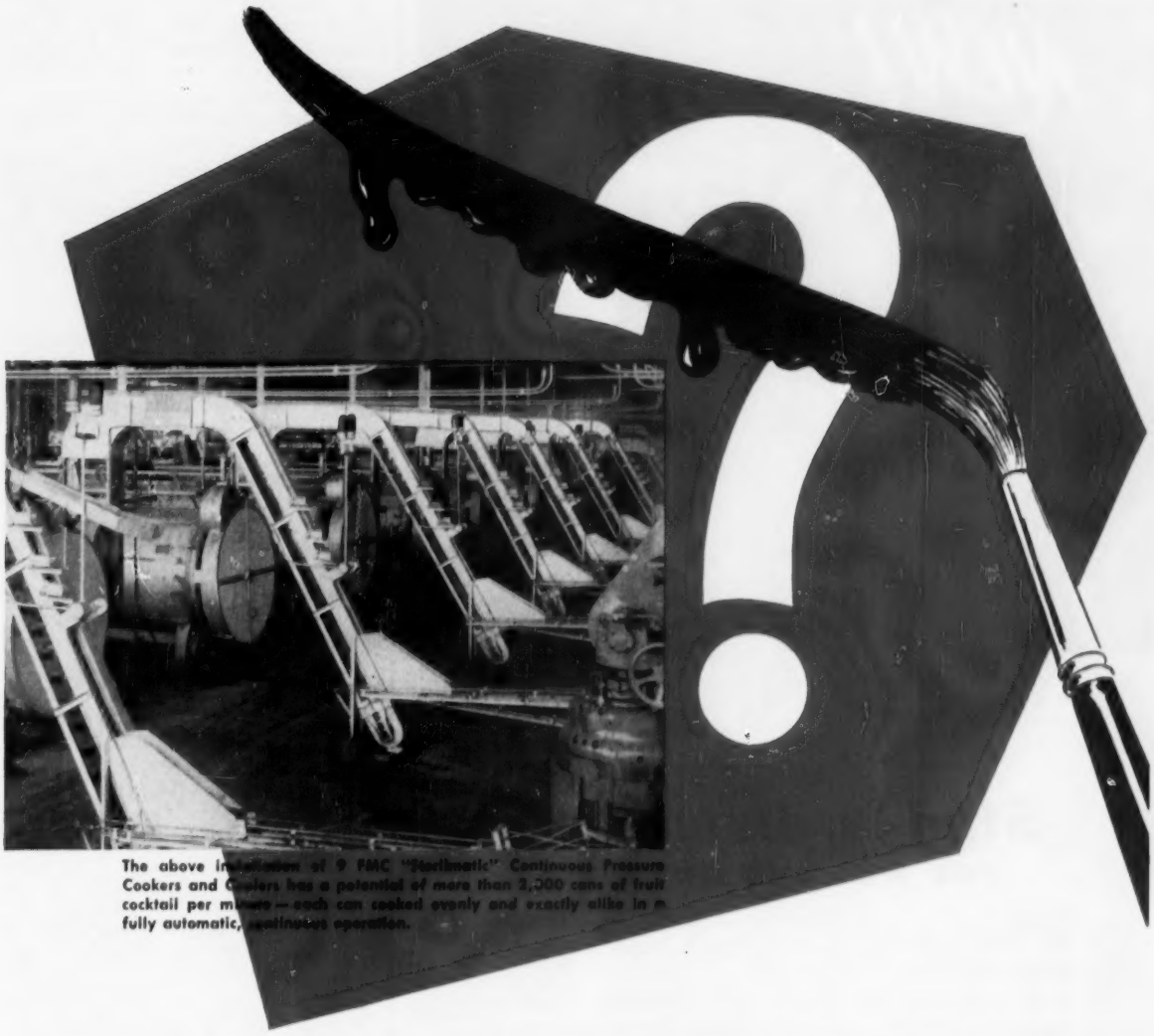

The above installation of 9 FMC "Sterilmatic" Continuous Pressure Cookers and Coolers has a potential of more than 2,000 cans of fruit cocktail per minute—each can cooked evenly and exactly alike in a fully automatic, continuous operation.

# Taking the Guesswork out of Commercial Processing

The "Sterilmatic"* in-can method of processing gives canners everything they need to maintain highest uniformity and quality standards with dependable regularity.

It literally takes the guesswork out of sterilizing and quality control. Now canners control time periods and temperatures to predetermined measurements of unbelievable accuracy. Instruments and controlling devices allow any selective degree of temperature to be maintained with utmost dependability. The continuous flow of canned foods is fast, smooth and gentle. Efficiency is unmatched. Product texture, taste, color and nutrients are preserved as with no other cooking method.

See how the FMC "Sterilmatic" Continuous Pressure Cooker and Cooler can fit into your present operations. Just call your nearest FMC representative, or write for full information. There's no obligation.

*Trade Mark—Reg. U.S. Pat. Off.

**FOOD MACHINERY AND CHEMICAL CORPORATION**

*Canning Machinery Division*

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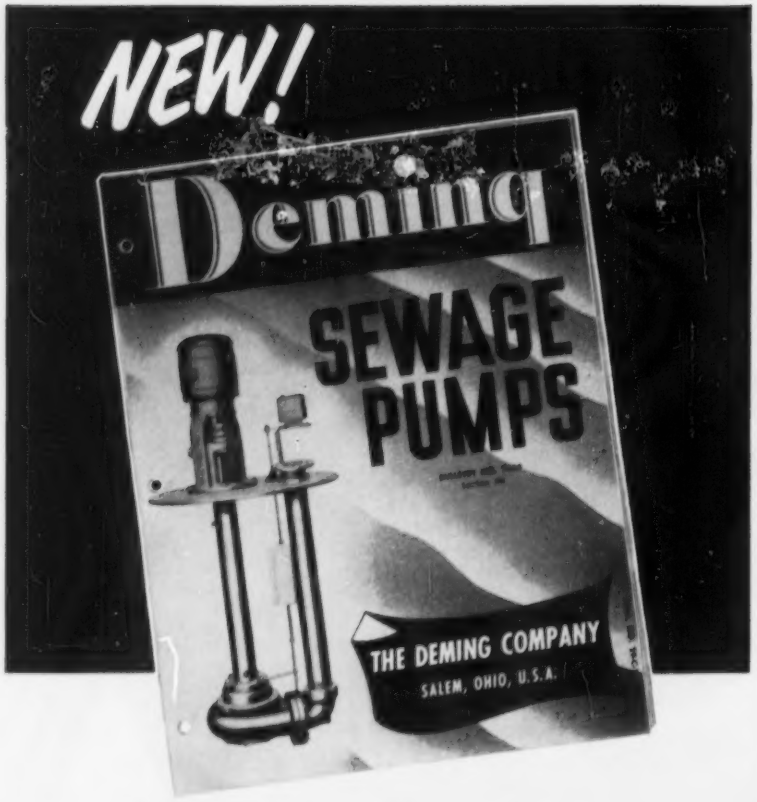



**Standardized Line**

**FOR WET AND DRY PITS**

Check this new standardized line of Deming Sewage Pumps. BULLETIN 7500 shows their modern features and explains their advantages.

Heavy duty construction, close tolerance dowelring fittings from motor base through to pump casing, and positive alignment of all rotating and guide-bearing parts assure smooth, dependable operation and a minimum of maintenance.

*And note this: Obsolescence factors reduced to a minimum!*

Sizes range from 2½ to 4-inch discharge. Pumps handle solids from 1½ to 3 inches in size. Single and Duplex units available for wet and dry pit installations. Capacities range to 900 g.p.m. and heads to 110 feet. Units can be furnished with various types of drives up to 20 H.P.

**AND NOTE THIS:**

Quick deliveries assured. Repair parts available for prompt shipment.

***Send for Bulletin 7500 NOW!***

**THE DEMING COMPANY, 556 Broadway, Salem, Ohio**

***Pump it with STANDARD***

**DEMING PUMPS**

***and roll up SAVINGS!***

up sufficiently to use the added production and reduce the surplus. More money will be spent for advertising and promotion, particularly by fluid milk dealers.

"Labor costs—which have mounted steadily to 21 cents of each sales dollar this year—will continue to rise. Prices of milk and most dairy products, however, probably will remain steady."

### Meat Packers Optimistic

"There's every likelihood that production and consumption both will continue at present rates during 1957," National Independent Meat Packers Assn. reports.

"And meat packers will be able to put quality products on American tables at prices commensurate with the improved state of health of the average consumer's pocketbook.

"In 1956 the 'independent' packer enjoyed a relatively better position than during the years immediately preceding, because he was operating in a fairly stabilized industry."

### Millers Doing Well

"Business conditions in the milling industry are good," says Millers National Federation.

"There is no drastic change apparent in the foreseeable future."

Information from various sources indicates that the popularity of prepared mixes is painting the brightest business picture that millers have seen in years.

### Tough Going in Rice

Two tough business situations are pointed up by the decision of Rosenberg Bros., San Francisco, to get out of the rice milling business.

Japanese buyers are withdrawing from the California rice market due to more favorable prices elsewhere (Thailand, Italy, Burma).

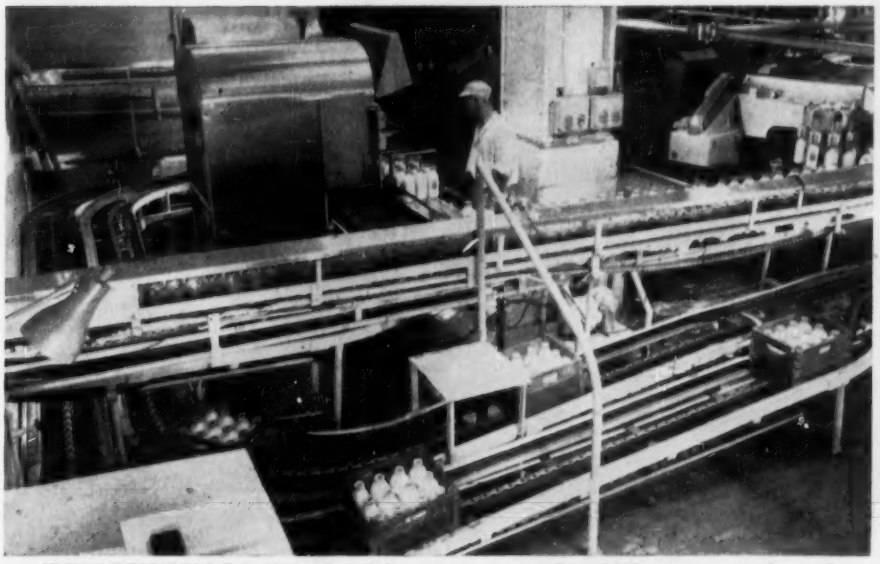
Co-ops which grow rice as well as process it have the advantage of the price support program. It was a co-op, Rice Growers Assn. of California, that bought out Rosenberg's rice operations.

### Behind Freight 8-Ball

Skyrocketing freight rates have put the Western food packer behind the 8-ball with his Eastern counterpart. Since 1946 there have been six national rate changes, amounting to an increase in excess of 90%.

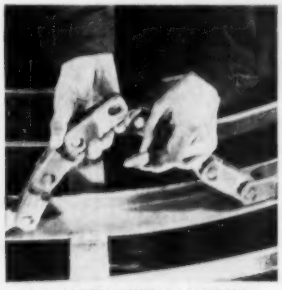
With the new 5% increase obtained by the railroads, Pacific Coast packers

# Link-Belt 4250 swivel chain conveys around curves—over vertical turns



**HIGHLY FLEXIBLE** Link-Belt 4250 swivel chain conveyor operates in multi-planes . . . saves time and effort while maintaining smooth flow of milk cases.

**SMALL SPACE REQUIRED** by 4250 chain conveyor gives this packing plant extra storage.



**EASILY DETACHED OR COUPLED.** Chain may be lifted out of track and taken apart by hand.

**RENEWABLE** "Flint-Rim" sprocket segments can be quickly attached to sprockets.

## Broad top surface of links reduces wear on cases

Durable and extremely flexible, 4250 swivel chain is Link-Belt's answer to multi-plane conveying of cartons, cases, crates and similar containers in breweries, dairies and other bottling plants. Its swivel joint construction permits both horizontal and vertical travel—provides safe handling of containers around 15" radius horizontal turns. And single- or multiple-strand conveyors can be arranged to clear machines and other obstructions . . . or to facilitate receiving, processing, storage or shipping.

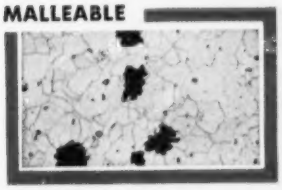
### Wear Points Strengthened

Link-Belt 4250 swivel chain consists of links webbed across the top for greater strength and rigidity. Broad, flat carrying surfaces reduce wear on objects being conveyed. And smooth, flat vertical sides provide generous contact areas which minimize wear from track and guides on turns.

Designed to operate in standard 2-inch tracks, Link-Belt 4250 swivel chain is made with cast ball and socket type pins that simplify detachment or assembly—without tools. Although easily disassembled, it cannot disengage in normal operating position.

File-Hard Promal is standard for this chain, assuring long wear life.

**MALLEABLE**

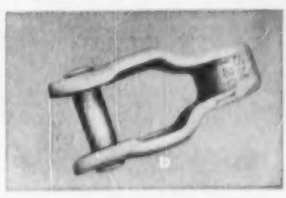


**PROMAL**

**MICROPHOTOS** show difference between ordinary malleable iron and Promal. Left—white areas in malleable microphoto represent "free iron" . . . black shows soft nodules of carbon. Right—dark areas in Promal structure show stronger, stiffer reinforcing material which strengthens metal; resists distortion, wear.

## SM-120 chain is in wide use on brewery and dairy conveyors

Link-Belt SM-120 chain spells low-cost, straight-line conveying of cases, crates, etc., in various bottling operations. It's made of cast offset links connected consecutively with pins locked against rotation in sidebars. Closed joint construction keeps dirt out. Integral solid round barrels add strength.



SPECIFY "FILE-HARD" PROMAL FOR LONGER WEAR-LIFE

Link-Belt Promal chain with "file-hard" surfaces is the ideal answer for the extra strength and wear resistance demanded by heavy loads and long, sliding conveyors in bottling plant service. This special Link-Belt metal lasts much longer . . . costs but a little more. Both pins and integrally cast links of Link-Belt 4250 and SM-120 chains are furnished in File-Hard Promal.

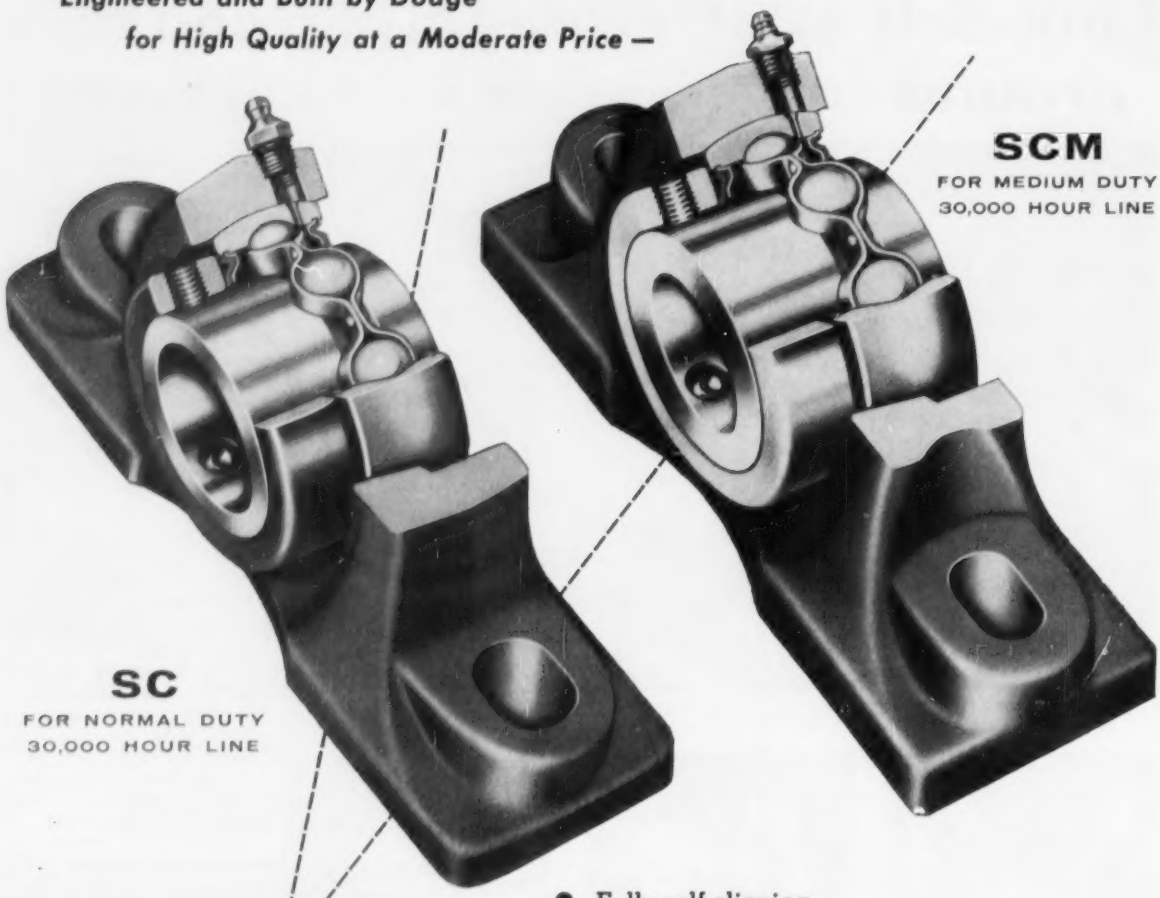
**HEADQUARTERS FOR CHAINS, SPROCKETS** is your nearby Link-Belt factory branch store or authorized stock-carrying distributor. Write for 342-page Catalog 950.

LINK-BELT

CHAINS AND SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14,302

*Engineered and Built by Dodge*
*for High Quality at a Moderate Price —*



**SCM**
FOR MEDIUM DUTY
30,000 HOUR LINE

**SC**
FOR NORMAL DUTY
30,000 HOUR LINE

# The Seal *Won't Blow!*

- Fully self-aligning.
- Rugged one-piece housing.
- Fully assembled and pre-lubricated at the factory.
- Sealed both on and off the shaft.
- Metallic backed synthetic rubber seals keep lubricant in, dust and dirt out. Engineered to stay put—*the seal won't blow!*
- Pillow block and flange cartridge types.
- Available from distributor stocks—SC in shaft sizes from 3/4" to 2-7/16"; SCM from 1-7/16" to 3-7/16".
- Write for bulletin complete with tabular data, engineering drawings, dimensions, weights, and radial load ratings.

**Call the Transmissioneer**, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone directory, or write us.

**DODGE MANUFACTURING CORPORATION**
**2800 Union Street, Mishawaka, Indiana**

**DODGE**
*of Mishawaka, Ind.*



← For more data, circle this page number on card at back

are in an intolerable competitive position. They had requested rate hold-downs on canned foods similar to that granted to Western lumber producers. They suggested a maximum increase of 5¢ cwt. on canned food classifications. Any greater increase will tend to force them out of Eastern markets. The new hold-down is 7¢.

Without a new increase, the rate for the long haul to New York favors the Wisconsin pea packer over one in the Pacific Northwest by $1.02 cwt.

## HORS D'OEUVRES

▶ **At Houston's new Drive-Thru Market, the family chariot rolls along rows of shelves as an attendant puts selected items into a basket hung on the car door. The trip could easily cost $1,000 a mile.**

▶ But you haven't heard anything. Chicago's Blackhawk proprietor believes that meals prepared by famous chefs around the world will be rocket-shipped to your favorite restaurant. The cost? Who cares? Its for the future.

▶ **A record 184.2 bottles of soft drinks were guzzled per person in 1955. And we predict that 1956 will cap that beverage climax.**

▶ If you mix powdered mustard with water, and pour it into wormholes, the worms will crawl out. We report this not for gourmets, but for fishermen.

▶ **Frozen Food Day was celebrated at the Miami Beach convention of freeze-packers by attendance at Tropical Park Race Course. To some in the highly competitive field, the horses seemed like a relatively sure thing.**

▶ Cheese is readily digested if you take it with crackers or bread and don't gulp it down, American Medical Assn. reveals. So another food fallacy bites the dust, except—how can anyone stand to eat limberger slowly?

▶ **Chief executives in the food industry averaged less than 1% in pay increases in 1955, compared to 6.3% for industry in general. How tough can this business get?**

How does Carling's make every cool stein

**TASTE THE SAME?**

Accurate control is the answer. For instance, to make sure every drop of Carling's is formula-perfect, more than a dozen of these Neptune meters accurately measure and record liquids used in various stages of the process at Carling's new brewery in Natick, Mass. Principal uses are in finishing and blending, in filtration and carbonation rooms, and in wort processing.

Flow of liquids is registered automatically and continuously by the Neptune Meters with big time-savings over the batch-measuring methods previously used. According to Roger D. Williams, plant engineer, the Neptune meters are accurate and trustworthy, and are valuable for inventory control in addition to quality and uniformity control.

Find out how Neptune Meters will benefit your operation by sending for Meter Application Bulletin 566-EF

**NEPTUNE METER COMPANY**
**19 West 50th St., New York 20, N.Y.**

**NEPTUNE *liquid* METERS**

BRANCHES IN ATLANTA • BOSTON • CHICAGO • DALLAS • DENVER • LOS ANGELES
LOUISVILLE • NO. KANSAS CITY, MO. • PHILADELPHIA • PORTLAND, ORE. • SAN FRANCISCO (MILLBRAE)
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# Save up to $1.10 per thousand tea bags* with STOKESWRAP Automatic Packaging

*Taken from an actual case study

Savings in tea bagging costs with Stokeswrap contrasted to custom packaging are as much as $1.10 per thousand as established by recently completed case studies. These savings appear whenever tea bag production reaches 4,000,000 units or more each year. Cost comparison includes the investment in machinery, materials cost and labor, based on an average production of 120 bags per minute. In addition to cost savings, Stokeswrap gives you *complete* control of quality and production scheduling.

If you contract your tea-bagging, it will pay you to investigate Stokeswrap now . . . and join the many nationally famous packers who are sold on Stokeswrap tea bagging equipment.

## Iced-Tea Bags

Stokeswrap can also make ¼ or ⅛ oz. and 1 or 2 oz. tea bags for restaurant use as well as cup-size tea bags, all without tags.

## with STOKESWRAP you get . . .

- *Mechanical simplicity* — requires only one unskilled operator for cartoning.
- *Low-initial investment* — substantially below other units of this type.
- *High daily production* — up to 140 a minute through efficient operation.
- *Uninterrupted production* — paper, tags and string can be changed without stopping machine.
- *Compact* — smooth running unit occupies a minimum of floor space.

*For complete details, send for 8-page Bulletin P-801.*

**STOKES & SMITH CO.**

4914-J SUMMERDALE AVENUE, PHILADELPHIA 24, PA.

*Pacific Coast:* SIMPLEX PACKAGING MACHINERY, INC., 534—23rd AVE., OAKLAND 6, CALIF.

fmc

SUBSIDIARY OF FOOD MACHINERY AND CHEMICAL CORPORATION

# DEVELOPMENTS TO WATCH

Special

FOOD ENGINEERING

Service to Executives

**Jet-propelled immersion freezing** of turkeys is in operation at Farbest Turkey Co., Frankfurt, Ohio. Kent Industries unit spray-propels plastic-bagged birds through sub-zero propylene glycol.

**Ultrasonic cleaning of pump parts** and pipe fixtures is being tried in a brewery. Idea stems from ultrasonic cleaning of aircraft engine parts.

**"It will revolutionize coconut industry"** is prediction by Philippine President Ramon Magsaysay for process innovation. One machine slices, drys, presses, and grinds coconuts, and discharges high-grade oil and flour.

**Irradiation of foods will continue** to be prime research target as Army's plan for pilot plant at Lathrop, Calif., takes concrete form—also as QMC presses hard for irradiated components in new atomic-age rations.

**Oxidative rancidity in mayonnaise** may be prevented by addition of oxidase-catalyase enzyme, recent research indicates.

**Flexible glass-fiber roof,** shaped like a cone, is used on new 200-ft. diameter storage unit being built by Cargill at Toledo. Pneumatic pressure supports flexible roof while storage space is being filled.

**More tangy summer sausages** will be produced this year. They will be made by using a new lactic acid starter culture developed by AMI and approved by government. Starter soon will be available for commercial use.

**New electronic inspector** uses high-frequency current to detect nature and volume of material in package. The Photobell unit even will spot fill that appears slack, though weight is right, as in cereal carton.

**Automation of warehousing** at food plants and distribution centers is coming fast. In-and-out handling controlled by pushbuttons or punched cards is possible. C. Schmidt & Son's brewery has control-panel dispatching system for storage and loading conveyor operations.

**Further upgrading of quality is coming** for poultry packers. Government inspection of plants is likely. And use of antibiotic to keep eviscerated birds fresh longer is spreading.

**Voluntary USDA inspection** has been adopted by a leading seafoods packer, primarily to offset consumer reaction to general decline in fish-stick quality last year. Watch for smaller, quality packers to follow.

**Bacteria can improve flavor** of maple syrup, USDA has discovered. When a microorganism of the *Pseudomonas* family is allowed to grow in sterile sap 4 to 8 days, flavor is greatly intensified, though syrup is darkened.

# TWO WAYS to make your

## *These* HURON *taste-enticers create the*

**HURON MSG** puts taste aplenty into your own fine flavors!

Flavors wake up and consumers take notice when you use Huron MSG in your products. It's amazing the way it intensifies the flavor that's there—without adding any taste of its own. It's also amazing the way it keeps customers and retailers coming back for more.

This "taste-maker" works its magic in fresh, frozen, and canned food specialties. Meat, poultry, seafoods, vegetables, canned goods, and packaged dinners are at their appetizing best when Huron MSG is added. Huron MSG is pure MonoSodium Glutamate 99+%.

*And there's just one place to get them both . . .*

# market say: "M-m-m . . . more!"

## *"plus" flavor that means "plus" sales!*

**HURON HVP** adds the rich savor of oven-browned beef to food specialties!

Whether you want merely a suggestion of distinctive meat flavor or a dominant meaty taste, Huron HVP is the answer. Its "flavor of meat" comes from tasty, nutritious wheat protein. Working alone or together with Huron MSG, it gives your specialties the hearty flavor that keeps your brand right out in front in consumer preference. Huron developed the first complete line of HVP–Hydrolyzed Vegetable Proteins–offers it in liquid, paste or powder forms. Write today for information, samples, helpful technical service right in your plant.

Huron

MSG • HVP • AGE-IT

*American Pioneers in Protein Derivatives*

**THE HURON MILLING COMPANY**

**Executive Office:** 3101 N. WOODWARD AVE., P. O. BOX 9, ROYAL OAK, MICH. **Sales Offices:** 9 PARK PLACE, NEW YORK 7 • 161 EAST GRAND AVE., CHICAGO 11 • 383 BRANNAN ST., SAN FRANCISCO 7 • 607 SECOND NATIONAL BLDG., CINCINNATI 2. **Factory:** HARBOR BEACH, MICHIGAN.



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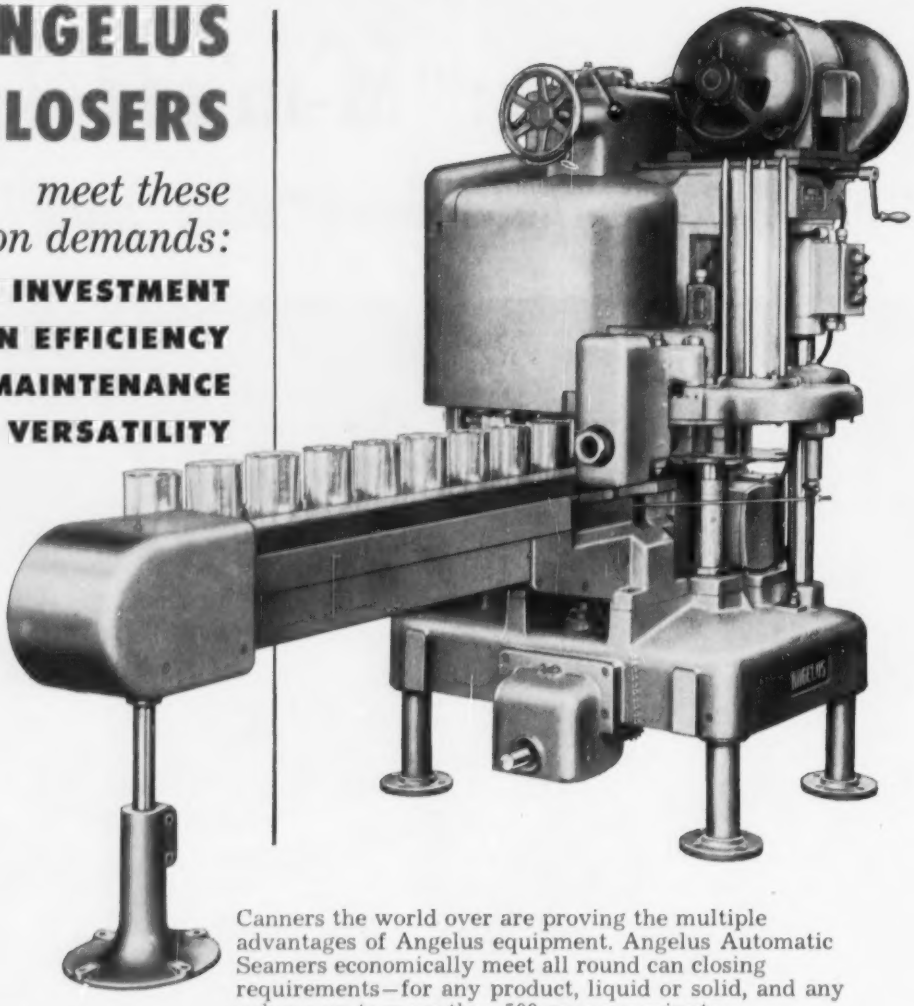
# ANGELUS CAN CLOSERS

*meet these production demands:*

**LOW INVESTMENT**
**PRODUCTION EFFICIENCY**
**MINIMUM MAINTENANCE**
**VERSATILITY**

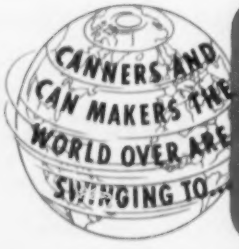


Canners the world over are proving the multiple advantages of Angelus equipment. Angelus Automatic Seamers economically meet all round can closing requirements—for any product, liquid or solid, and any volume up to more than 500 cans per minute.

Model 60 L is just one in the wide range of proven Angelus Can Closing Machines. It is fully automatic and is equipped with six seaming spindles in a rotating turret. The straight line feed, with constant can speed, from conveyor to discharge, assures the maximum in high speed, spill-free performance. Simple machine adjustments vary height capacity and readily installed change parts accommodate for changes from 2⅛" to 4¼" in can diameter. Optional drives provide a production range from 200 to more than 500 cans per minute.

Angelus Can Closing Machines are the product of over 45 years of engineering development and manufacturing experience... and Angelus is the only manufacturer in the nation specializing in the production of round can closing machinery and accessories.

Write today, specifying your requirements for an Angelus-engineered application recommendation.




**ANGELUS**
*Sanitary Can Machine Company*
Cable Address "Angelmaco" Western Union Code
4900 Pacific Boulevard • Los Angeles 58, Calif.

Zip-type opener . . .

. . . easy mix squeeze-bag—

# Put New Convenience In an Old Southern Dish

SUCCESS of a new product depends largely on the creative and functional design that goes into its package.

A top-flight contender in the highly competitive packaged mix market is Corn Bread Easy Mix, a new product launched by Quaker Oats Co., Chicago.

Chief reason for the spectacular sales figures already turned in by this modern form of an old Southern favorite is its container—named the outstanding flexible package of '56 by National Flexible Packaging Assn.

It is a functional combination—made up of four packaging materials: polyethylene, foil, tissue, and paperboard—that cuts the housewife's mixing and washup work to the very minimum by eliminating conventional bake pans and mixing bowls.

Starting from the inside, the dry mix (consisting of corn meal blended with shortening, leavener, and seasonings) is contained in a polyethylene bag (Cellu-Craft Products Corp., New York City).

This film was selected after weighing such factors as grease resistance, moisture impermeability, film strength, price, shelf life of the plastic, and strength of heat sealing.

At the converter, bag is formed from tubular stock and bottom-closed with a heat seal. Film gage is 0.002 in.—strong enough to resist a housewife's kneading.

Quaker Oats secures the top of the bag, after filling, with an easily removed acetate tape tie (Minnesota Mining & Mfg. Co., St. Paul).

Bag is then nested into a folded foil bake pan of 0.007-in. gage aluminum (Reynolds Metals Co., Louisville, Ky.). This pan measures 1-in. deep, 8-in. long, and 5¼-in. wide.

Pan and bag are enclosed in a plain, paperboard carton (National Carton Co., Joliet, Ill.).

Choice of an overwrap led to foil—superlative both in attractive appearance and in the added scuff protection and moisture impermeability it imparts to the package.

But Quaker Oats wanted a heat sealing wrapper for production speed, so the foil was laminated with microcrystalline wax to tissue (Reyseal 111, Reynolds).

The laminate is composed of 0.00035-in. aluminum foil, wax-mounted on 15-lb. tissue. This is further wax-mounted on 8-lb. tissue.

The 15-lb. paper gives body to the wrapper. The second, thin tissue permits wax to bleed through for the heat seal.

To use, the housewife simply rips off the tear tape—applied at one end of the carton under the foil—and thus releases bag and pan. Removing the acetate tie on the bag, she adds an egg and half a cup of milk, then grasps top firmly and kneads the bag for a few seconds to mix its contents.

Mix is finally squeezed into foil pan and baked. The aluminum pan unfolds at the corner for serving. And bag, pan, and carton go into the wastebasket.

For top impact in "putting over" its convenience story to consumers, Quaker Oats picked Raymond Loewy, Chicago, to design its package. The result is a tight-fitting unit that extracts maximum economy from the construction materials.

The thin, wide shape connotes the baking pan theme, yet lends itself to ready stacking on retail store shelves.

Front panel of the overwrap combines the four essential elements—product, mixing bag, bake pan, and Aunt Jemima trademark—in a four-color print on a printed white background.

Gold foil marks the edges of the pack for the yellow corn bread mix. Silver foil is used for a white corn bread mix now being tested nationally.

On the back of the package, four line-drawing illustrations, in differently colored panels, point up the simple mixing and baking instructions.

# NEW PACKAGES & PRODUCTS

## Polyethylene Spurs Citrus Sales

Increased sales appeal and product protection offered by polyethylene are causing more citrus fruit growers to adopt the tough and versatile film for pre-packaging.

The transparency of the film speeds customer selection as well as making an attractive package. The film's high tensile strength and tear resistance make it adaptable to a wide variety of packaging operations, from hand packing (see photo) to full automatic. The poly' resists oxidation and moisture, will not become brittle or discolored in storage.

**Sales Balance Cost**

Sunkist Growers, Los Angeles, are now using the film, convinced by extensive market tests. The slight extra cost (about 2.6¢) of the plastic bag over conventional mesh ones is reported to be more than balanced by extra sales.

Pre-packaging at the terminal level has been instituted by Florida Citrus Exchange, Tampa, which formerly supplied the bags along with the crated fruit.

It was found that retailers did not always have time to pack the oranges and grapefruit, so the packaging is now done at shipping centers in the bigger market areas—at Newark, Philadelphia, and Pittsburgh, for example. Pre-packaging terminals are also planned at Chicago, St. Louis, Cincinnati, and Cleveland.

The fruit is washed and brushed, then packed in Bakelite polyethylene bags. Grapefruit are packed six to a bag, regardless of weight. Oranges are filled in 5 and 8 lb. bags. Film is imprinted with the cooperative organization's trademarks, Seald-Sweet and Florigold.

Total time from grove to retailer with the new system is estimated at a maximum of 2½ days.

**Circle 20D on Reader Service Card**

←AMONG NEWEST ADVANCES in packaging and products: 1) Champagne-style bottle is package for new Capri soft drink-mixer made by Bireley Division, General Foods. 2) Printed rigid aluminum foil trays by Elco-Alcoa permit 2 or 3 color printing in transparent or opaque inks. (20A) 3) Available in 15¼ oz. and "individual portion" is H. J. Heinz's chili con carne with beans. 4) Handy multiple carton holds three 1½ lb. cans of Hormel ham. Manufacturer is Atlanta Paper Co. (20B) 5) Five-jar miniature barbecue spice rack sells Tryne spices. Bottles have white molded plastic closures and poly' sifter-fitments. (20C)

### Frozen Apple Slices

Fresh frozen apple slices are now marketed in a Visqueen polyethylene film bag by Goldman Foods, Inc. Midwestern acceptance of the product is reported as high by the Wisconsin processor.

Sulphur dioxide and citric acid are used as preservatives.

Developed by Cello-Foil Products, Inc., the gusseted plastic bag holds 20 oz. Transparency enables the consumer to inspect the product. Also the film is unaffected by freezer temperatures.

**Circle 20E on Reader Service Card**

# frosting mix . . . easy to fix

PILLSBURY'S NEW MILK CHOCOLATE FROSTING MIX USES RIEGEL'S POUCHPAK*. . . FOIL LAMINATED TO SPECIAL POUCH PAPER, POLY-COATED . . . DESIGNED TO RUN AT HIGH SPEEDS ON PNEUMATIC SCALE PACKAGING MACHINES.

* T.M.

Protecting the sales-winning qualities of fine products is only one of the many functions of Riegel papers. Saving money is important, too. Riegel does it for you by creating the right combination of the most efficient packaging materials . . . and by "tailor-making" the paper to run and seal at high speeds on your machines. Tell us what you want paper to do for you. Riegel Paper Corporation, P.O. Box 170, Grand Central Sta., New York 17, N. Y.

Riegel PROTECTIVE PAPERS FOR PACKAGING

GLASSINES AND GREASEPROOFS
Plain • Waxed • Printed
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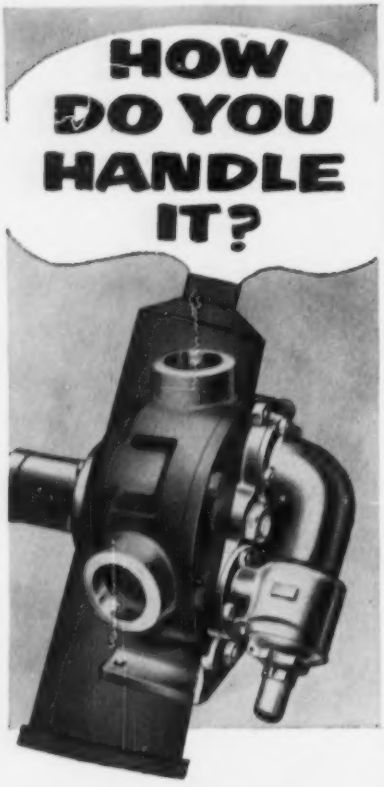



# PUMP IT WITH A VIKING

Here's the answer to your problem of moving semi-solid materials of types usually dispensed in squeeze tubes. With Vikings you can pump such materials as tooth paste, shaving cream, petroleum jelly and many others, in a smooth, even flow. Hundreds of plants are doing it.

Viking's simple, rugged "gear within a gear" principle makes it adaptable to most pumping needs. There are 750 catalogued models and thousands of specially built pumps and units. If you have a pumping problem, call on Viking Pumps for assistance. Ask for bulletin 57Se.

**VIKING PUMP CO.**
Cedar Falls, Iowa, U.S.A.
In Canada, it's "***ROTO-KING***" pumps
SEE OUR CATALOG IN SWEETS


## *Packages & Products*

### Protects Can Shoulders

Longer shelf life and improved quality are reported as the advantages of American Can Co.'s new Cerafilm shoulder guard for beer cans.

Cerafilm is a shock-resistant lubricant that protects the can's enamel lining at the shoulder when the ends are rolled on. The shoulder guard is said to minimize exposure of beer to bare metal, boosting flavor, foam and clarity.

Cerafilm is inert to beer. Adaption of the method does not require adjustment or change in present closing apparatus. It is placed on the can ends so it meets or overlaps the sealing compound, extending up the countersink wall over the countersink radius and outer edge of the bead.

Circle 22A on Reader-Service Card

### For Boys—and Girls

Skinner Manufacturing Co., Omaha, is currently packaging its raisin bran cereal in two package styles—one for boys, one for girls. Differentiation is used to assure purchaser of the right toy premiums, five of which are packed in each box of the product.

### New Fortified Shortening

Flair, an all-vegetable shortening, was recently introduced by the Foods Division of Anderson, Clayton and Company. Flair is a hydrogenated shortening, yellow in color, with a distinctive aroma and texture. It is fortified with vitamins A and D.

The Dallas, Texas, processor reports that the product "gives everyday cooking true luxury taste . . . puts new flair in recipies."

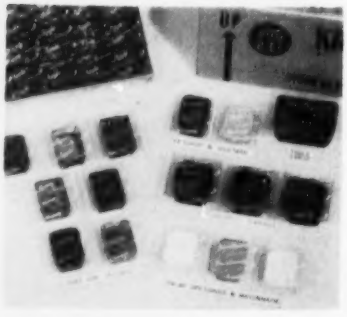
### Expands Pancake Line

Quaker Oats has added two new products to its Aunt Jemima line: blueberry pancakes and buckwheat pancakes. Both are pre-baked and need only be heated in an electric toaster Each 9 oz. package holds six pancakes.

### 6 New Sandwich Spreads

A new selection of sandwich spreads has been added to the Armour and Company line. Packed in ¾ oz. reusable glasses, the spreads include liver with bacon, beef garlic, and dill; ham; beef with pickle and peppers; pork and beef; and beef with barbecue flavor.

The products do not require refrigeration, though chilling is recommended.



### Portion Control Packs

A wide range of portion control units of jellies, deserts and condiments is being processed by Kraft Food Co. Known as "PC's," the servings are packed in an unbreakable plastic dish, hermetically sealed. Average shelf life is six weeks.

Among products offered: Apple,

# CHECK THE FACTORS MOST VITAL TO YOU

*Whether you're President, Vice-President, Treasurer, Purchasing Agent, Sales Manager, Production Manager, Traffic Manager, Advertising Manager...the above factors in selecting the right shipping containers deserve your personal attention.*

*Call your nearby Gaylord packaging engineer for boxes made to your prescription.*

Gaylord Boxes

CORRUGATED AND SOLID FIBRE BOXES • FOLDING CARTONS • KRAFT PAPER AND SPECIALTIES • KRAFT BAGS AND SACKS

GAYLORD CONTAINER CORPORATION ★ ST. LOUIS

DIVISION OF CROWN ZELLERBACH CORPORATION



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CONTINENTAL *Landmarks*

*Periodic progress reports of interest and value to the packing field*

# New Savorlock cans for hygroscopic products combine long shelf life and positive reseal

Intended to spur impulse sales of instant coffee and other "hard-to-hold" products, Continental's newly announced Savorlock cans are believed to be the first of their category to be made on high-speed lines for maximum economy.

Eye appeal is provided by brilliant lithography, plus unusual package proportions, established on the recommendation of a well-known industrial designing firm. The two sizes – 204 x 315 and 305 x 507 – are pleasing in appearance, while getting as many units as possible into each running foot of shelf space. Additionally, the lightweight cans stack securely.

Intensive store evaluations show no appreciable moisture pickup four months after stocking. After tamper-proof glassine inner seal is broken, the lock top gives a positive reseal in day-to-day home use.

**Supermarket time studies reveal it takes a shopper an average of 4 seconds to choose an item from a grocery shelf. New Savorlock cans, in 2 and 6-oz. capacity, are specifically designed for today's impulse buying.**

## PERTINENT DATA ON THE NEW Savorlock CANS

The full opening and positive resealing features recommend Savorlock for almost any powdered or granulated product, food or non-food. Evaluations have been confined to instant coffee as being one of the most hygroscopic of food products now marketed. Other products for which tests can be arranged include:

- Soluble tea and tea bags
- Chocolate and cocoa
- Non-fat dry milk
- Dehydrated soups
- Prepared chocolate mix
- Baking powder and soda
- Spices
- Vegetable flakes
- Brown and confectionery sugar
- Peanut butter
- Pharmaceuticals
- Laundry starch, bleach

Also instant gravy mix, bouillon cubes, powdered egg whites, dry coconut, prepared dips for fried foods, bread crumbs, hard candy, cookies, dessert powders, dry rice, instant potatoes, etc.

**CONTINENTAL CAN COMPANY**

Eastern Division: 100 E. 42nd St., New York 17
Central Division: 135 So. La Salle St., Chicago 3
Pacific Division: Russ Building, San Francisco 4
Canadian Division: 5595 Pare St., Montreal, Que.

## Packages & Products

Cranberry, Grape, Orange, Red Currant, Strawberry, Honey (jams and jellies); Caramel, chocolate and strawberry dessert toppings; french dressing; mayonnaise; salad dressing; catsup; mustard; and table syrup.

Circle 22B on Reader Service Card

### Poly'-Coated Boards

Polyethylene has replaced paraffin in General Fibre Products Co.'s coated food boards. A-C poly', because of its low molecular weight and low viscosity, is similar in handling qualities to the commonly used wax.

The supplier is reported to be able to coat bleached white food board with polyethylene without resorting to extrusion.

The boards are coated with pure poly' for use by the bakery industry, and with a poly'-wax blend for meat and cheese pre-packing.

Circle 25A on Reader Service Card

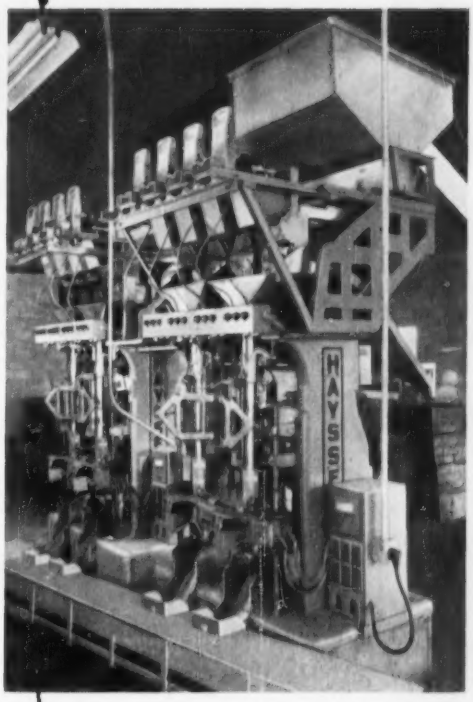
### Add Biscuits to Line

General Mills has added Bisquick Refrigerated Biscuits to its Betty Crocker line. Two styles are available: buttermilk and regular milk-type.

Special feature of the products is the pull-string opening the cylinder package. The biscuits are lifted out in a 3-ply foil wrapper which protects against moisture and keeps biscuit shapes.

Only 8-10 min. of baking are needed to prepare the ten biscuits in each can. By following directions on the foil wrapper, the consumer may transform the biscuits into doughnuts, breadsticks, or other quick breads.


COMPAK high-production "Poly" Packaging continues to set new records for performance and economy!




Gressinger & Sons have produced over 25,000,000 perfect Polyethylene packages of radishes in one year's time on these two Hayssen COMPAK machines.

● No other packaging machine on the market can boast this record of production and dependability with polyethylene.

Whatever your product; solid, liquid or powder, we can produce a better package at less cost.

The simplified machine principle of COMPAK has made it first choice in every industry where perfect design register, accuracy and a true hermetically sealed package is necessary.

Let our experienced packaging engineers help you with your polyethylene packaging problems. Contact us TODAY and see how easily COMPAK fits into your operation.

HAYSSEN

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# New TOLEDO Weight Data Systems

**Originating, Transmitting, Processing, Recording**

**Digital Weights Transmitted Anywhere**

- Adding Machine
- Electric Typewriter
- Tape Punch
- Card Punch
- Digital Indication

Toledos now provide electronic wings for your weights! A great time-saver combined with Toledo accuracy! Even though the weights originate in production, inspection, testing, shipping or receiving, the weight data travels instantly for remote digital recording in the form you want it. This new forward step brings a closer than ever link between good weight control and high accuracy in accounting records.

**Automatic Bulk Weighing**

You get *printed and totalized weight records* instantly—on a remote electric adding machine—with this Toledo Automatic weighing, recording and totalizing system. Its job is to keep cost-control tab on bulk material such as flour going into truck or carload shipments.

**Product Testing and Sorting**

Toledos today automatically check and classify a wide range of parts. Here leaf springs for autos are tested and classified automatically by this custom-engineered Toledo at the rate of 600 an hour!

**Dial location wherever you choose with Electronic Toledos**

A new type of Toledo—the Electronic Load Cell Scale—eliminates mechanical connections between platform and scale head. This gives new flexibility to testing as well as weighing applications. Dial head can be located wherever desired. Also, the weight data can be processed in a variety of recorders and office machines. Ideal for many dynamometer, motor truck, hopper and custom test device applications.

**Batching in Automatic Interlocked Systems**

This Toledo cabinet interlocks 22 scales in an automatic batching system. Through TOLEDOmation all ingredients are fed into successive batches in proper sequence, including operation of gates and feeders. In addition, all dials are automatically scanned and the digital weight data is recorded on an electric typewriter for each batch.

Whether you are moving forward to a plant-wide weight control system, or are considering the closer linking of your weighing with accounting through modern Toledo weight data processing units, you will find that a discussion with a Toledoman may be helpful. We will be glad to send booklets on remote digital weights, or on "a plant-wide look at weighing". Write Toledo Scale Company, Toledo 1, Ohio.

**TOLEDO®**

**HEADQUARTERS FOR SCALES**


## Packages & Products

### 4 New Seafood Meals

After extensive and successful test marketing, four new heat-and-serve frozen seafood meals have been added to the Gorton's of Gloucester line.

New main courses include fillet of sole in lemon butter, fish steaks in tomato sauce, fish steaks in cheese sauce, and filet of flounder in mushroom sauce. Each 8-9 oz. package contains four portions of raw fish and a portion of pre-cooked sauce, all in an aluminum pan.

### New Strawberry Box

A new packaging unit for strawberries consists of a qt. size strawberry basket or cup and an 8 qt. corrugated tray. Developed by Central Fibre Products Co., the unit offers sales appeal as well as protection.

Basket is made of specially treated board, rigid and strong enough to protect the berries. It has a pat-

# PROTECTIVE'S

DRUM LINERS ★ BAGS ★ CARTON LINERS

... all styles, all sizes,
produced with fine materials:
Polyethylene, Vinyl, Laminates
and other flexible films —
all at surprisingly LOW PRICES!

DRUM LINERS

BAGS

CARTON LINERS

*Double-Seal Guaranteed Safety...

# SUCCESS!

**"TWIN-SURE" DOUBLE-SEAL**
*straight bottom liners*

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*round bottom liners*

. . . originated and manufactured by the pioneers in plastic-liners for steel drums, fibre containers, cartons and boxes . . . successfully tested and proven satisfactory for protective packaging by many of America's leading manufacturers, processors and laboratories.

*. . . here are just a few users of protective liners:*

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National Lead Company
Chas. Pfizer & Co., Inc.
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## PROTECTIVE LINING CORPORATION

GENERAL OFFICES AND PLANT: 22 WOODHULL STREET, BROOKLYN 31, NEW YORK

** TRADEMARK




For more data, circle this page number on card at back →

# B.F.Goodrich

## Oil can't soak into Koroseal, so belt never gets rancid

THEY were replacing conveyor belts every 4 to 6 months in this pecan processing plant. Oil from the nuts soaked into the belts, made them rancid. It made some belts get soft and sticky, it made others harden and crack. All kinds of belts were tried—premium rubber, cotton, even plastic coated—but the oil ruined them all.

When a B. F. Goodrich distributor heard their troubles, he recommended the Koroseal belt. Because it's made of Koroseal flexible material, this improved food-handling belt stands nutmeat oils, cooking oils, animal fats, most acids—and just about everything else that ruins most belts.

Unlike belts that are just coated with plastic, Koroseal is used throughout the B. F. Goodrich belt, and so resists cracking and peeling, never gets soft or sticky. Oil can't soak into Koroseal's tough, polished surface; food particles can't grind in. That's why this belt is so easy to clean. No need to scour it. Just a wipe with a damp cloth and detergent, and the Koroseal belt is as clean and new looking as ever. Koroseal belts have no odor, no taste, never get rancid.

After trying a test belt (it is now in its 20th month), owners of the pecan company have had Koroseal belts put on all their conveyors. All of the Koroseal belts have now lasted 50% longer than previous belts, and they all look good for many more years. Let a B. F. Goodrich distributor tell you more about the complete line of belts B. F. Goodrich has developed for the food industry. Or write *B. F. Goodrich Industrial Products Co., Dept. M-833, Akron 18, Ohio.*

Koroseal—T.M. Reg. U.S. Pat. Off

**B.F.Goodrich**

**INDUSTRIAL PRODUCTS**

cnted self-locking bottom, and may be assembled by pressure at the two extremities.

The 1 qt. tray features easy assembly and good ventilation.

Circle 26A on Reader Service Card

## Robot-Cake Packaging

Complete packaging automation is reported to have come to Dressel's Bakeries, Chicago, with use of Marathon Corp.'s cake cartons.

Octagonal Kliklok trays are automatically inserted in Marapak-H cartons instead of the former foil pan with crimped-on paperboard lid.

The new package means beter stacking and more units per frozen food case. The Kliklok trays are formed on a BK Kliklok former and are inserted in the cartons on a random feed machine.

Circle 29A on Reader Service Card

## New Product Shorts

**Two Frozen Concentrates** will be introduced soon by Hawaiian Pineapple Co., Ltd. Pineapple-grapefruit and pineapple-orange are the flavors to be marketed under the Dole label.

**Frozen Chocolate Cake** is fourth Sara Lee product.

**Miniature Meals** for baby processed by Heinz now include vegetables, egg noodles, and chicken—in both strained and junior style.

**Ham Pot Pie** is reported as Armour & Co. frozen "first".

**Cocoanut in Foil** has been added to Durkee Famous Foods' line.

**Tomato Mustard** is new product of Frank Tea & Spice Co., Cincinnati. Packed in 8 oz. wide-mouth jar, it is blend of catsup and mustard.

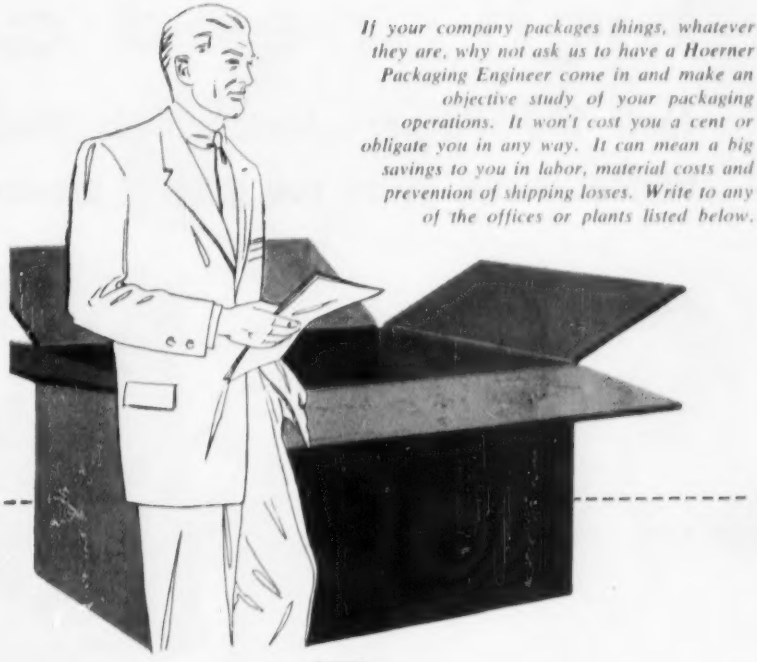
**Another Frozen Soup** for Campbells is old fashioned vegetable with beef.


# Packaging Problems?

*A Hoerner Packaging Engineer offers you a profitable solution*

Successful manufacturers, both large and small, call on the experience and know-how of Hoerner Engineers to help solve their packaging and shipping problems. The Hoerner Engineer studies a shipping operation. Then he designs a package geared to the specific needs of a product. Results are savings all along the line . . . savings in materials, savings in handling and shipping costs, savings in reduced damage claims. What the Hoerner Packaging Engineer has done for others, he can do for you.

*If your company packages things, whatever they are, why not ask us to have a Hoerner Packaging Engineer come in and make an objective study of your packaging operations. It won't cost you a cent or obligate you in any way. It can mean a big savings to you in labor, material costs and prevention of shipping losses. Write to any of the offices or plants listed below.*



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GENERAL OFFICES—600 Morgan St., Keokuk, Iowa • PLANTS—Keokuk, Des Moines and Ottumwa, Iowa Sand Springs, Oklahoma • Minneapolis, Minnesota • Fort Worth, Texas • Sioux Falls, South Dakota Fort Smith and Little Rock, Arkansas • Cajas y Empaques Impermeables, S. A., Mexico City D. F., Mexico

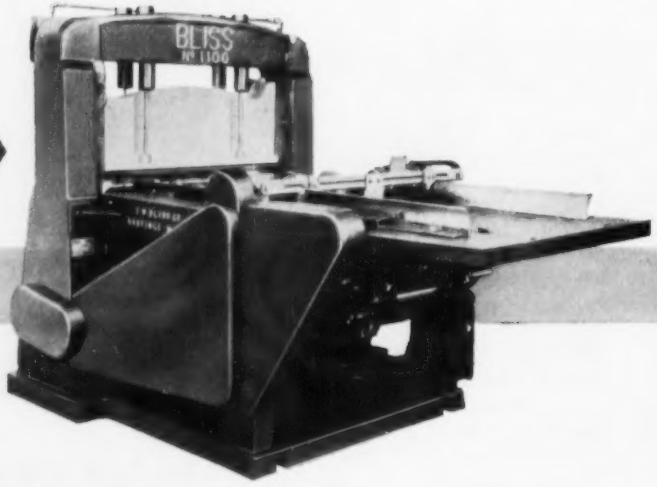
for can bodies...

**BLISS BODYMAKER NO. 403**—forms 400-500 #202 to #404 sanitary bodies per minute. Easily set up and adjusted.

# Six newly-designed key machines for high-speed can lines

***Their 400-500 per minute speeds, their adaptability to various sizes, gives you greater production at less cost***

**SCROLL SHEAR NO. 1100**—blanks scroll cut strip from 36x36" sheet at 125 spm.




for can ends and closures...

BLISS
SINCE 1857

*A Century of Making Metals Work for Mankind*

**E. W. BLISS COMPANY, Canton, Ohio**

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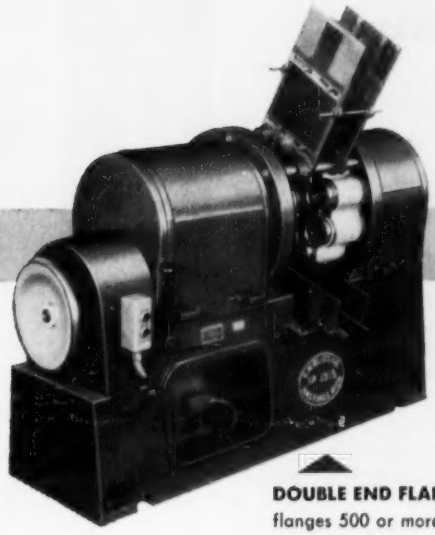
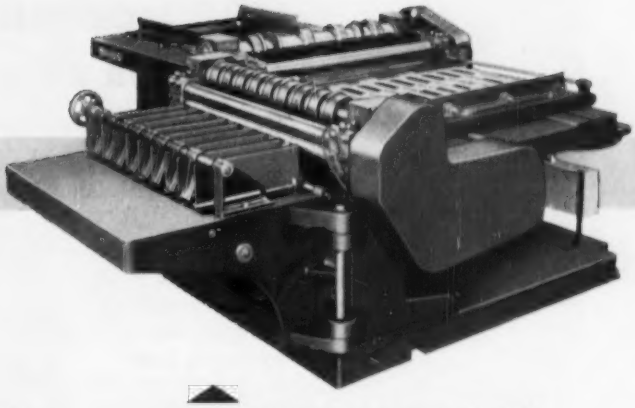


**DOUBLE END FLANGER NO. 1315**—flanges 500 or more per minute: diameters from 2 to 4-3/16"; heights, 2 to 8".



**DUPLEX TRIMMER AND SLITTER NO. 5225**—trims and slits, or slits bodyblanks from 36x36" sheets. Speed: 30-75 per minute.

Every day more Bliss can machinery appears in leading can making plants. Reports show that they prove themselves in many ways.

They produce more cans with far less downtime. They are easily set up, readily adapted to changing requirements. And they are dependable, running shift-after-shift, day-after-day with little need of maintenance.

It makes sense then to call Bliss—whether you need one machine or whole new line. Why not give your nearest Bliss Field Engineer a call, or write to E. W. Bliss Company, Canton, Ohio.

## Complete catalog available on any machine shown here.

1. Slitters, scroll shear
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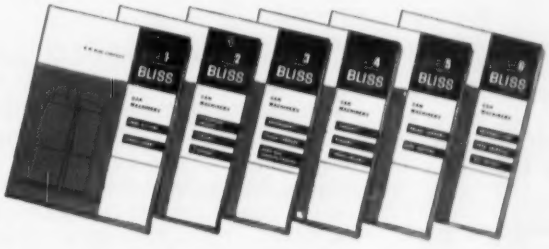
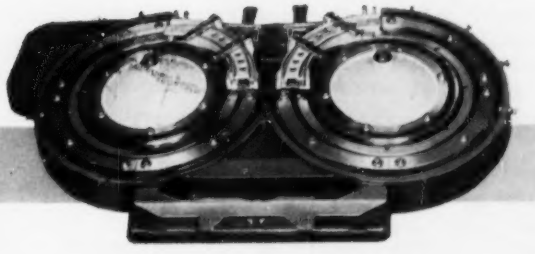
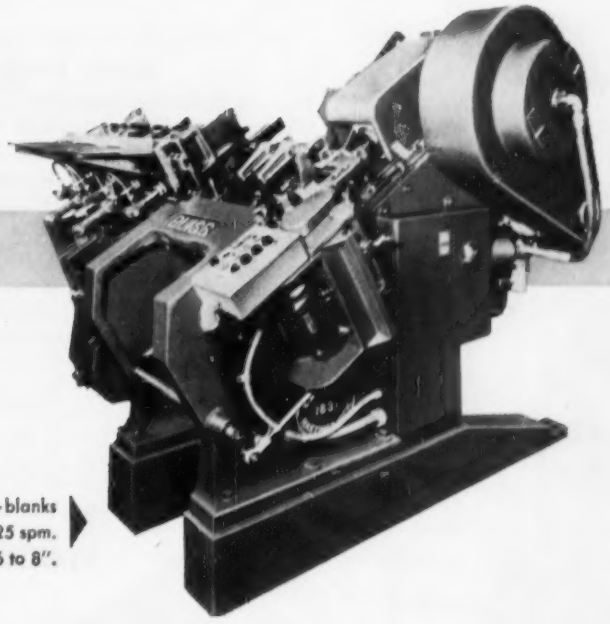
5. Double seamers, side seamer
6. Testers



**DOUBLE CURLER NO. 20**—Curls ends from 2 to 4¼" in diameter. Stackers, conveyor belt intakes available.



**STRIP FEED PRESS NO. 1831**—blanks and forms can ends and closures at 325 spm. Diameters: from 1-15/16 to 8".

# Three food plant lube problems STANOIL Industrial Oil can help you whip

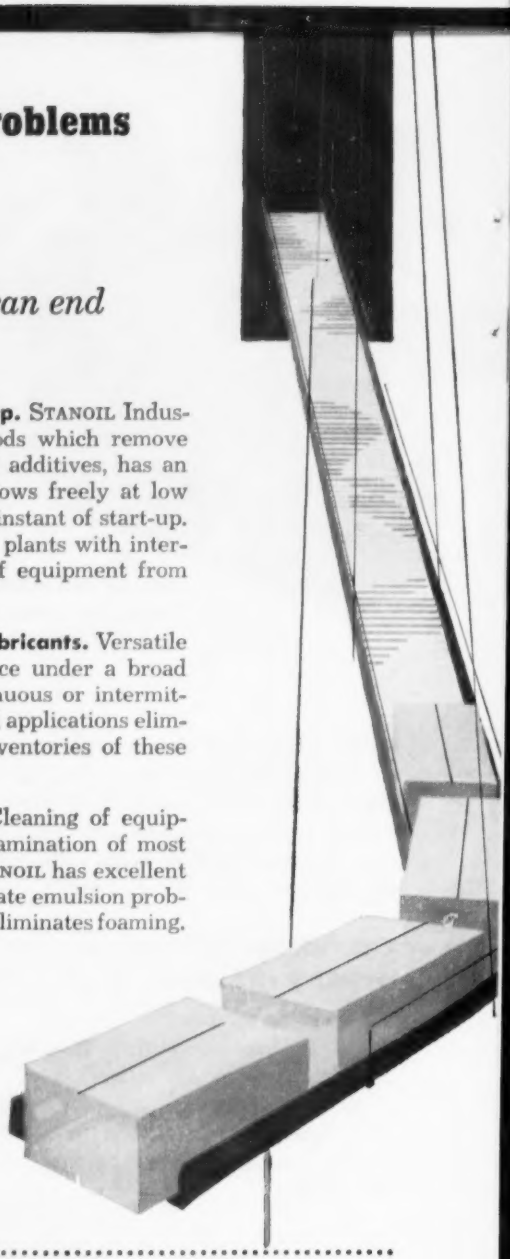
*big maintenance headaches can end with switch to STANOIL*

**1. Poor flow of lubricant on cold start-up.** STANOIL Industrial Oil, due to selective refining methods which remove waxy constituents and the use of special additives, has an exceptionally low pour point. STANOIL flows freely at low temperatures, is ready to lubricate at the instant of start-up. Candy, bakery and other food processing plants with intermittent production get full lubrication of equipment from start to stop.

**2. Large inventory of special purpose lubricants.** Versatile STANOIL gives top lubrication performance under a broad range of conditions...heat or cold, continuous or intermittent, high pressures and low. One oil for all applications eliminates special purpose oils, eliminates inventories of these oils, eliminates application mistakes.

**3. Water contamination of lubricant.** Cleaning of equipment and condensation mean water contamination of most oils with resulting water-oil emulsion. STANOIL has excellent demulsibility, is specially refined to eliminate emulsion problems, contains an additive which virtually eliminates foaming.

Check with your Standard Oil industrial lubrication specialist about converting your plant to STANOIL. There is one of these Standard men near you in any of the 15 Midwest and Rocky Mountain states. Call him or write Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Illinois.



## Quick Facts About STANOIL Industrial Oil

- **Stability.** STANOIL's antioxidant gives oil resistance to chemical change, minimizes deposits.
- **Rust Prevention.** Inhibitor in STANOIL "plates out" on metal surfaces, prevents corrosion.
- **Cold Starts.** STANOIL has low pour point. Flows freely from cold start. No need for costly warm ups.
- **Resists Effects of Temperature Change.** STANOIL has high viscosity index, is resistant to change in both high and low temperature service.
- **Excellent Demulsibility.** STANOIL is refined to eliminate emulsion problems, contains additive to minimize foaming.

**STANDARD OIL COMPANY**
(Indiana)

STANDARD

**Ole Sage Episode**

**"What you tell your employees," said Ole, "can help a lot, if properly timed. It's the same as when you go to roll this ball onto the alley. You'll likely gutter it—unless you time your steps."**

# *How to Avoid Charges of Discrimination?*

**IVAN C. MILLER**
"Food Engineering"

"I'M CERTAINLY LEARNING that it takes time to properly talk out the things you should and shouldn't do when you face union organization!"

The speaker was Bertram Barnastian, senior partner of Barnastian Bros. Bakery Co., and the scene was the Ram's Head Inn, where a number of the Guff & Gripers were gathered for dinner and a discussion prior to joining the Zenith Canning boys for an evening of bowling.

"Anyhow," Bert went on, "I'm very pleased that we could have this meeting just a few days after the regular Guff & Gripers' luncheon—because with the present situation at our plant, time is of the essence. I mean, I want to quickly get these things straight in my mind. And I surely hope we can cover the remainder of the subject tonight, before everybody goes over to bowl."

Ole Sage leaned back as a waiter began removing the first-course dishes. "Well," he grinned, "there's been a flood of papers, pamphlets, and books on the subject. And in addition, there are enough records and findings of NLRB and the courts to fill a small library. So we can merely highlight matters in these sessions of ours. Even so, Bert, we're going to try to button it all up for you.

"We were talking about discrimination," Ole continued. "And I'll lead off right now by saying there's a 'don't' on our list that will go far toward avoiding union accusations of discrimination and charges of unfair labor practices that generally follow.

"This is a point for foremen particularly and management generally: Don't permit situations to arise that involve a deviation from established company policy as a means of firing an employee—especially a union sympathizer. Furthermore, foremen definitely shouldn't discriminate when disciplining employees.

"However, if an employee *must* be fired during this period, the foreman should first make sure that there are valid reasons for it—reasons that are backed with justifying evidence."

**By this time** several others were taking notes. "Slow down a little, Ole," Luke Markham pleaded. "I want to get all this down for my friend Talmerage, who expressed such a deep interest in this subject at our recent group outing."

"All right," agreed Ole. "Just stop me if I go too fast. Anyhow, here's another: Caution your foremen that though there may be some of the employees they'd like to be rid of, they should never let the fact be known by word or act during this period.

"And so, if a lay-off of part of your force is necessary, make certain that the selection of those to be dropped is fair and justified, and not based on an attempt to weaken the union's strength, or to discourage others from signing union cards.

"Still another thing: This is not the time for promoting anyone on the general working force, if it can be avoided. However, if certain promotions are necessary, caution your foremen that they must be able to fully justify their selection.

"And if it's necessary to transfer workers to off-hour shifts, again be sure the selection is fair and not on the basis of their union views."

Ole paused a moment, then pressed on: "In these instances, urge your foremen to make a careful check on the worker's training and experience, length of service with the company, and all other recorded qualifications, before transferring him to a new job.

"Also be sure to advise your foremen not to segregate union and non-union sympathizers—not to thus intentionally team up people who seem to be alike in their attitudes toward unionization.

"Likewise, when assigning over-

## *Exposes foreign matter and residue! Resists oils, acids, alkalies!*

Globe White Neoprene Rubber Belting installed on leading make conveyor.

**EXPOSED**: Dust, dirt and other accumulations! Product particles that are left behind!

The snowy whiteness of Globe White Neoprene Belting exposes them all to certain detection, enabling immediate elimination with hot water or live steam. *That's sanitation-plus!*

Known as the do-all conveyor belting of the food industry, for which it was specifically developed, Globe White Neoprene Rubber Belting consists of multiple layers of hard-woven, light duck, molded together with highest grade neoprene rubber between the plies and over the entire surface . . . finished with a 3/64" thick, satin-smooth cover on the carrying side and with a friction surface on the pulley side.

The characteristics of this type of construction are unmatched: Exceptional flexibility; high tensile strength; minimum stretch . . . all extremely advantageous in operations where head and tail pulleys are small, and on machines with limited take-up facilities.

Resistant to oil, grease, acids, alkalies — possessing a satiny smoothness that makes no impression whatsoever on the product conveyed, Globe White Neoprene Rubber Belting is today on the "must" list of numerous food processing and handling concerns.

Also available in Black. Ask about Globe White Ruff Top Neoprene Incline Belting, Globe Brown Neoprene Belting, with friction surface on both sides, and Globe Brown Kling-Top Neoprene Belting, with non-slip top for incline and decline.

Write Dept. E for free samples, literature and the name of your local distributor.

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KNOWN FOR QUALITY THE WORLD OVER


time work or specially desirable jobs, be sure there is no bias in the selections.

"If it becomes requisite to hire employees during this period, be sure this hiring is not based on any feeling toward the union. Instead, make sure employees are chosen on the direct basis of experience and personal qualifications. Of course I don't need to tell you that this period prior to the election is a bad time to increase employment, just as it is to decrease it either by layoffs or firings.

"Assuming you do, however, look over some prospective employees, make certain they aren't questioned as to affiliation with a labor organization or attitude toward such.

"And finally, this point I've touched on before: Avoid any statement that might be construed as anti-union. Or any action, for that matter, which might indicate you'd prefer non-union workers."

**Ole now settled back,** his arms resting on his chair. "That list," he assured them, "just about covers the don'ts. However, there is one '*do*' which I omitted intentionally, but which I'd like now to emphasize strongly:

Whichever way your employees may finally vote on the union question, it will prove valuable for you to find out about all—or at least as many as possible—of the conditions that have caused employee dissatisfactions. Some of these conditions may be such that you will want to correct them at once; consideration of others may have to be postponed. But you may be sure there are dissatisfactions, otherwise the initial attempt to organize would have fizzled.

"For, remember that organizing costs money. So usually a union will fold its tent and fade as soon as it realizes there's strong employee resistance to organizing and judges that the chances of winning an election are very slim."

Bertram Barnastian now interjected: "I don't question the importance of finding out causes of failures and trying to correct them. However, my great interest at *this time* is in either postponing organizing attempts indefinitely or winning a non-union shop in event an election is required. Are there any suggestions on that? Any recommendations?"

"You know *me*," Batt Bulwark broke in. "I'd do what Ole'd say is the wrong thing. I'd call the workers together and lay it on the line to 'em. I'd tell 'em, 'Bring the union in now and you sure will over-

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**WITH FIRMENICH**
**POWDERED FLAVORS**

New and improved techniques of process drying, exclusively employed by Firmenich, yield powdered flavors that flow freely, are dust free, and give you the finest precision in flavoring your products. These important developments in quality flavoring will improve the taste appeal of your products . . . extend their shelf life . . . give them package-to-package uniformity that captures customer preference. Samples of Firmenich Powdered Flavors, with technical information on their practical application, on request.

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# Baker Trucks at Humko do double duty!

The Humko Company saves time and cuts costs with a fleet of 5 Baker Fork Trucks. Equipped with truck-loader mast and extra lift attachment, these trucks lift loads 148 inches—high enough for Humko's highest warehouse stacking jobs—from a 68-inch nested mast height—low enough to load highway trucks and boxcars.

Thus Humko takes full advantage of the flexibility of Baker Trucks—using the same trucks for double duty—saving the expense of additional equipment and saving the time of transferring loads from one machine to another . . . Let us show you how you can make similar savings in your plant or warehouse.

*The Baker line includes gas, electric and gas-electric powered fork trucks. Capacities range from 2,000 to 10,000 pounds.*

Baker® industrial trucks

**THE BAKER-RAULANG COMPANY**

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Otis

853

***Milt agrees that signatures aren't sure-fire union votes. "But," he says, "that coin has two sides —because management also may be lulled."***

(Story starts on p. 33)

turn the applecart—and might even lose your jobs!"

"The union would really love that," warned Milt. "They'd make capital of it. From then on they'd practically have it sewed up."

"Milt's right," agreed Ole. "There and many things that management shouldn't say during this period. As a matter of fact, many such moves are legally barred. There are, however, a number of things that can be said—statements that may prove very helpful—if properly timed. As with this bowling ball, here—you must time your steps when rolling it. Else you'll gutter it."

"Them last are words of wisdom," colloquialized Barney Hasbrook. "No election is over until the last valid votes are counted. And even though most of the employees may have signed union cards or a petition, that's no sure proof they'll actually finally vote for the union."

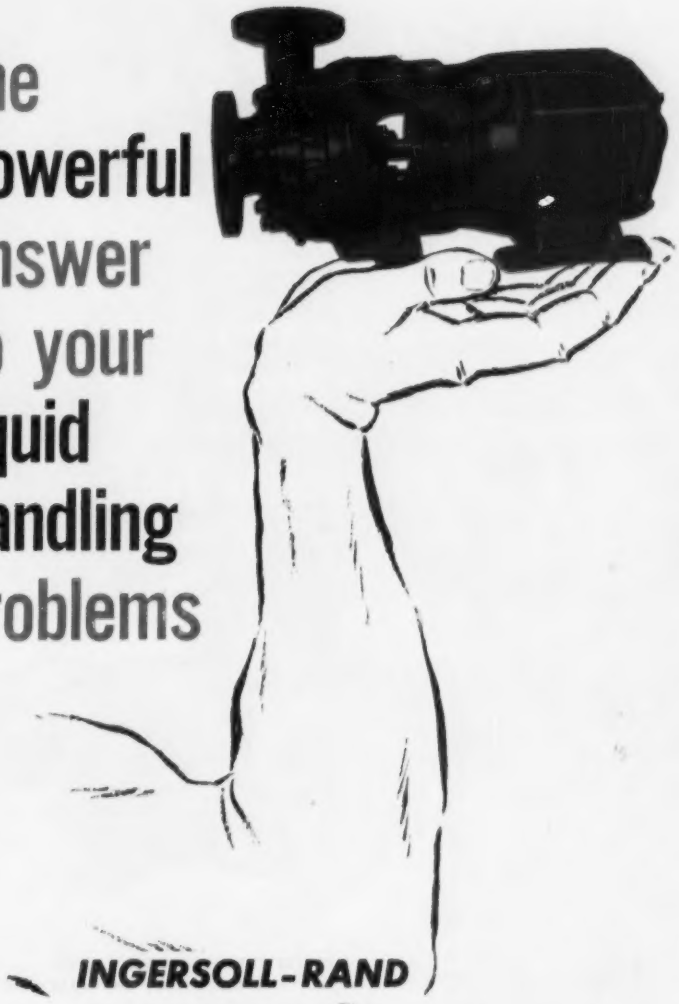
"Yes," said Ole, "union pressure, plus the workers' not wishing to appear to go against the supposed will of the gang, will often reap lots of signatures for the union. But signatures are a long ways from being solid votes on election day.

"When management wants to," he went on, "it can strongly influence employee attitude between the time the organizing started and the day of the balloting—so much so that what it says often has a decisive effect come election day. And for that matter, management can be equally influential during bargaining and before and during strikes."

**"Say, Ole,"** hurriedly put in Milt, "before it's too late I'd like to hoist a red flag. You point out, and rightly, that a union may lose an election in spite of the seemingly pro-union attitude of employees. Well, that coin has two sides. There is always the danger also that management will be lulled into over-confidence by the number of employees who apple-polish and assure management they 'wouldn't vote for the union'."

"That's just what happened at Zenith," broke in Ed Strong. "Of


the powerful answer to your liquid handling problems



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MOTORPUMP

When production lags because of inadequate pumping facilities, you need the dependable power of an Ingersoll-Rand Motorpump. These pumps are designed for deliveries of from 5 to 2800 gallons per minute, they operate in any position and being compact, save floor space as well!

I-R Motorpumps are efficiently designed for economical performance and ruggedly constructed to stay on the job with a minimum of maintenance.

To get all the details on I-R Motorpumps in sizes from ¼ to 75 hp, write for complete catalog data.

Ingersoll-Rand

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For more data, circle this page number on card at back →

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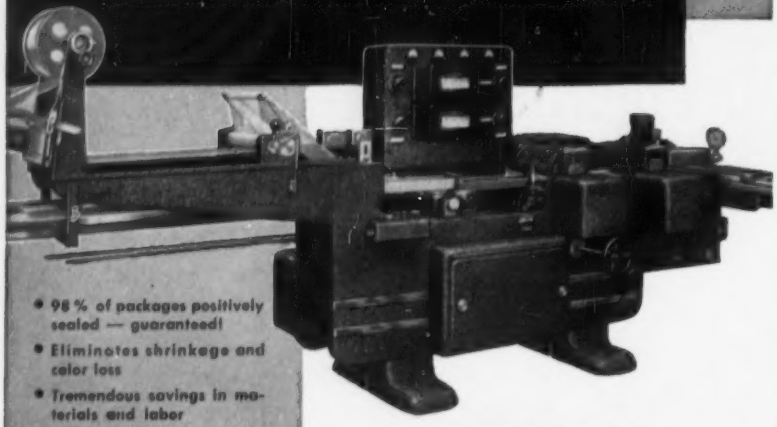
**SLICED LUNCHEON MEATS AND OTHER FOODS WITH**

*Guaranteed* **SEALING**

**Fast operating CAMPBELL Wrapper Seals in flavor, freshness and color . . . with**

*Less than 2% package "Leakers"*



- 98% of packages positively sealed — guaranteed!
- Eliminates shrinkage and color loss
- Tremendous savings in materials and labor
- 40 to 70 units per minute — double head
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- Increases sales appeal — wins new customers.

**DRASTIC SAVINGS IN PACKAGING MATERIALS AND LABOR ACTUALLY PAY FOR MACHINE IN *FOUR TO SIX MONTHS TIME!***

Amazing, but true—and field proven by America's leading packers. Automatic, the machine requires only one person for push-button operation. And, savings up to 65% on wrapping materials alone are effected because wrapper tightly hugs the product—requires no costly bags, double wraps or large overlaps to insure *guaranteed* positive sealing.

***High Speed Production*** — Sharply increased production effects further savings, too. Continuous feed, double vacuum head machine produces 40 to 70 units per minute—dependent upon wrap materials used. Single head machine—20 units and up.

***Get The Facts Today*** — Learn about this revolutionary, new VACUUM PACK Wrapper — how and why its "leak-proof" packaging production can be *guaranteed*. Write for full particulars.

## *Guarantee*

It is hereby guaranteed that out of every 100 units Vacuum-packed on a CAMPBELL Vacuum Pack Meat and Food Wrapper in regular production service — 98% or more will be positively sealed against leakage at sealing areas of heat-sealing wrapping material used for the package.

HUDSON-SHARP MACHINE CO.
GREEN BAY, WISCONSIN

Write for full colored brochure describing the CAMPBELL Wrappers—how they wrap and seal many products.

*Campbell*
WRAPPER
HUDSON-SHARP MACHINE CO. • GREEN BAY, WIS.

*Manufacturers of Aniline and Gravure Presses, Folders, Interfolders, Laminators, Waxers, Embossers, Slitters, Sheeters, Roll Winders, Packaging Machines, Creepers and Tissue Converting Units.*


course, that was years ago, and we were then plenty naive. Just before the election we had it sewed up definitely—to our way of thinking. We were assured that more than half our people would vote against the union—assured by their own say-so, of course. But," he grimaced, "that was before the ballots were counted."

"The outcome of an election is seldom sure very far ahead," Ole explained. "For, you see, once an election date is set, the union pounds away on employees with all they've got—and keeps on pounding. And a number of employees may 'buy' the ideas—adding votes for the union that you hadn't expected."

**Bert Barnastian** was all for switching the discussion back to the main line. He addressed Ole: "You were saying that before the election certain statements can and should be made by management, whereas others are legally barred. Well, I'd like to make a complete list of both."

"On that," replied Ole, "I suggest you contact the National Assn. of Manufacturers and get their special law department memo. It's titled, 'Free Speech Under the Taft-Hartley Act.' Anyhow, it gives you a review of NLRB rulings and court decisions regarding what can and can't be legally communicated by management to employees.

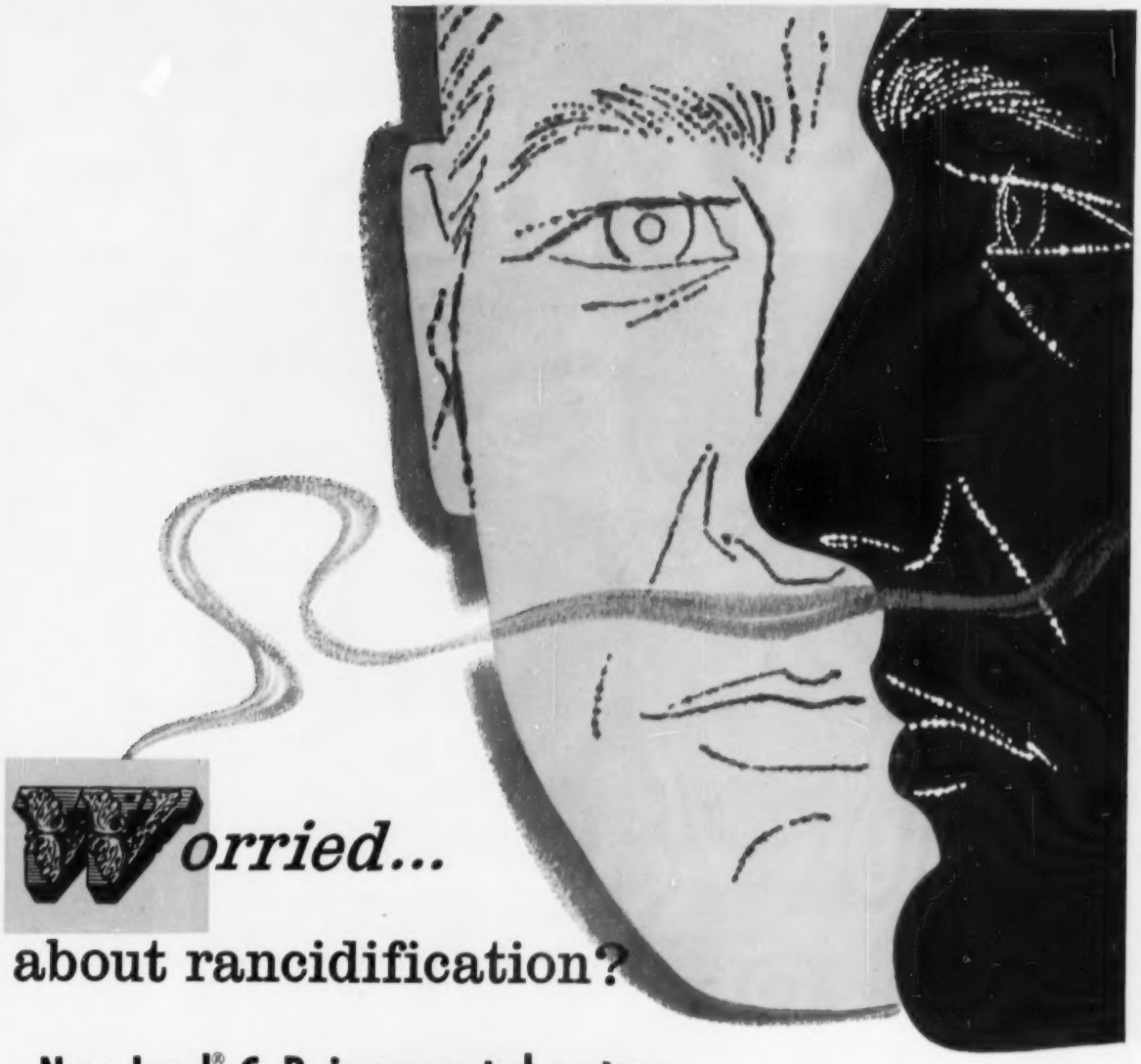
"Included are many examples of statements that have been made by managements to employees during organizing campaigns, during periods of collective bargaining, and also during strikes—statements which have been upheld by NLRB or the courts as proper exercise of the right of free speech."

"Your suggestion is sure appreciated," acknowledged Bert, "and I'll follow it at once. However, won't you please highlight some of the general rules?"

**"Sorry," spoke up Ed Strong,** "but that'll have to wait. If we're not in on time at the bowling alleys, our reservations won't hold. So let's hightail it right over there."

Bert looked a bit downcast—but then he suddenly brightened. "I've got an idea," he said. "All of you be my guests at luncheon next Friday noon—at my club, the Metro-Cosmo. I'll have a menu prepared from our line of convenience foods, and after eating we can finally finish off this unionization subject. Now, how many of you can come?"

Nearly every hand came up, and Batt Bulwark lampooned, "Nothing like a free meal to bring them out—and I'll admit that includes me."



# Worried... about rancidification?

## New Ionol® C. P.-impregnated cartons and wrappers protect flavor and aroma . . . *prolong shelf life*

YOU KNOW WHAT a serious, ever-present threat to shelf life rancidification is. Here's a new, simple, yet extremely effective way to combat it—Ionol,C.P. antioxidant.

Rancidity usually begins with fats and oils that have migrated to the surface of packaging materials. But, when boxboard and paper are impregnated with Ionol,C.P. antioxidant, they give dependable protection to aroma and flavor by effectively preventing oxygen attack on fats.

In actual tests, baked goods were stored at 85°F in Ionol,C.P.-impregnated boxboard cartons, which were found to be free of rancidity at the end of ninety days. Without Ionol,C.P. protection, packages of baked goods stored under similar conditions often develop rancidity within a week.

You can insure long shelf life and protection of your brand label's good name by asking for packaging materials containing Ionol,C.P. antioxidant. Write to Shell Chemical for names of suppliers of new Ionol,C.P.-impregnated packaging.

**SHELL CHEMICAL CORPORATION**

**CHEMICAL SALES DIVISION, 380 Madison Avenue, New York 17, New York**

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SHELL



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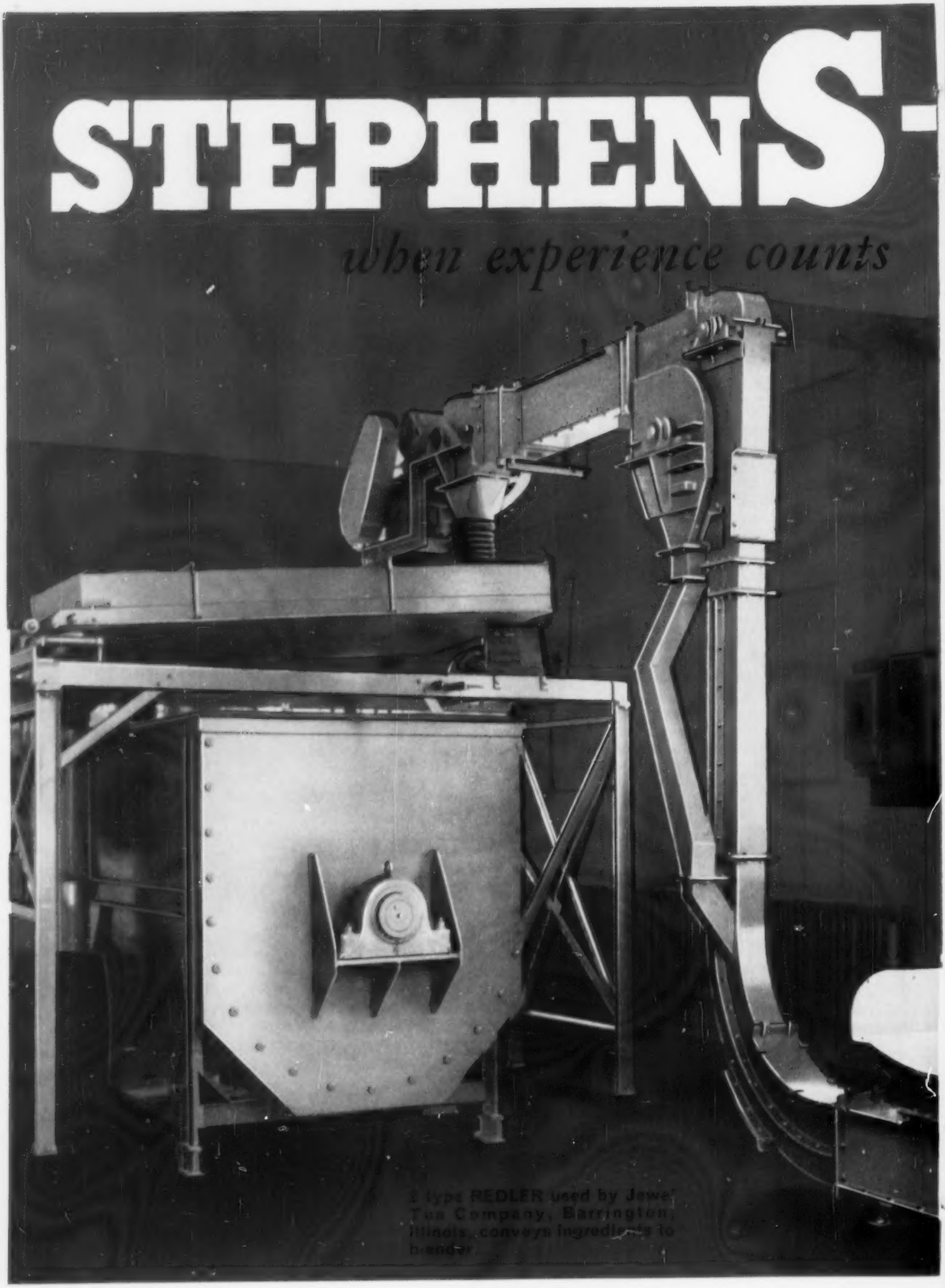
# STEPHENS-

*when experience counts*



2 type REDLER used by Jewel Tea Company, Barrington, Illinois, conveys ingredients to blender.

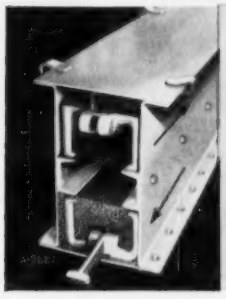
# -ADAMSON

## *in your bulk food conveying system*

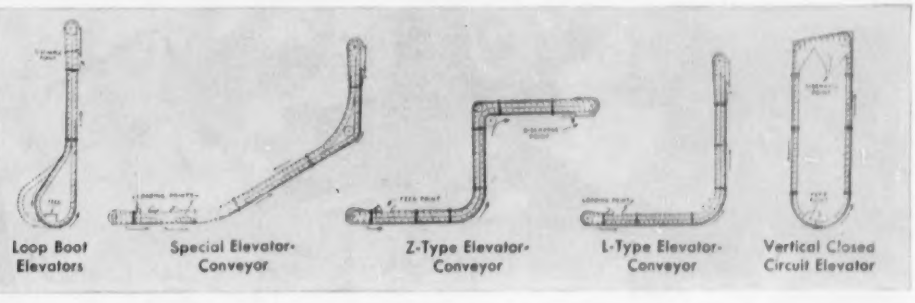
To meet ever growing demands at home and abroad, the food industry looks more and more to automation on the production line. The trend continues toward more specialized food preparation, more involved handling problems. Holding production costs in line calls for food handling techniques of the highest order.

For over fifty years, STEPHENS-ADAMSON engineers have worked closely with food processors in providing the finest bulk handling systems in the world. These systems have been molded from a widest selection of S-A manufactured conveyor products—products that embody the finest features of economy and dependability and, at the same time, guarantee by their design the highest standards of food protection and sanitation.

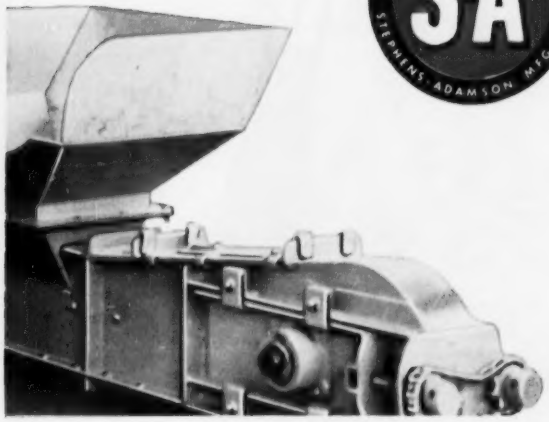
If you are thinking about a new conveying system, or if you are wondering just a little about the adequacy of your present one, why not consult the S-A engineer in your area? He may be able to help you turn some of your production costs into profit dollars.



CROSS SECTION VIEW OF REDLER CONVEYOR MADE ONLY BY S-A




While Stephens-Adamson builds practically all conveyor types, the REDLER conveyor-elevator is an S-A product exclusively. There are well over 20,000 in use today, many of them in the food processing industry. Shown here are a few of the arrangements possible with this tremendously versatile conveyor type.



**STEPHENS-ADAMSON MFG. CO.**

6 RIDGEWAY AVENUE, AURORA, ILLINOIS
LOS ANGELES, CALIFORNIA
BELLEVILLE, ONTARIO

S-A manufactures a wide range of material handling products in three complete plants in U. S. and Canada.

- Belt Conveyors
- Belt, Pan & Plate Feeders
- Ship Loading Boom Conveyors
- Stacking Conveyors
- Storage & Reclaiming Systems
- "Natural Frequency" Vibrating Conveyors
- REDLER Conveyor-Elevators
- ZIPPER Conveyor-Elevators
- Conveyor Belt Cleaners
- Headshaft Holdbacks
- Grizzlies & Screens
- Centrifugal Pilers
- Bin Gates & Tunnel Gates
- Car Pullers & Spotters
- Bucket Elevators
- Skip Hoists
- SEALMASTER Ball Bearing Units

• *Write for a bulletin on any of the above products.*



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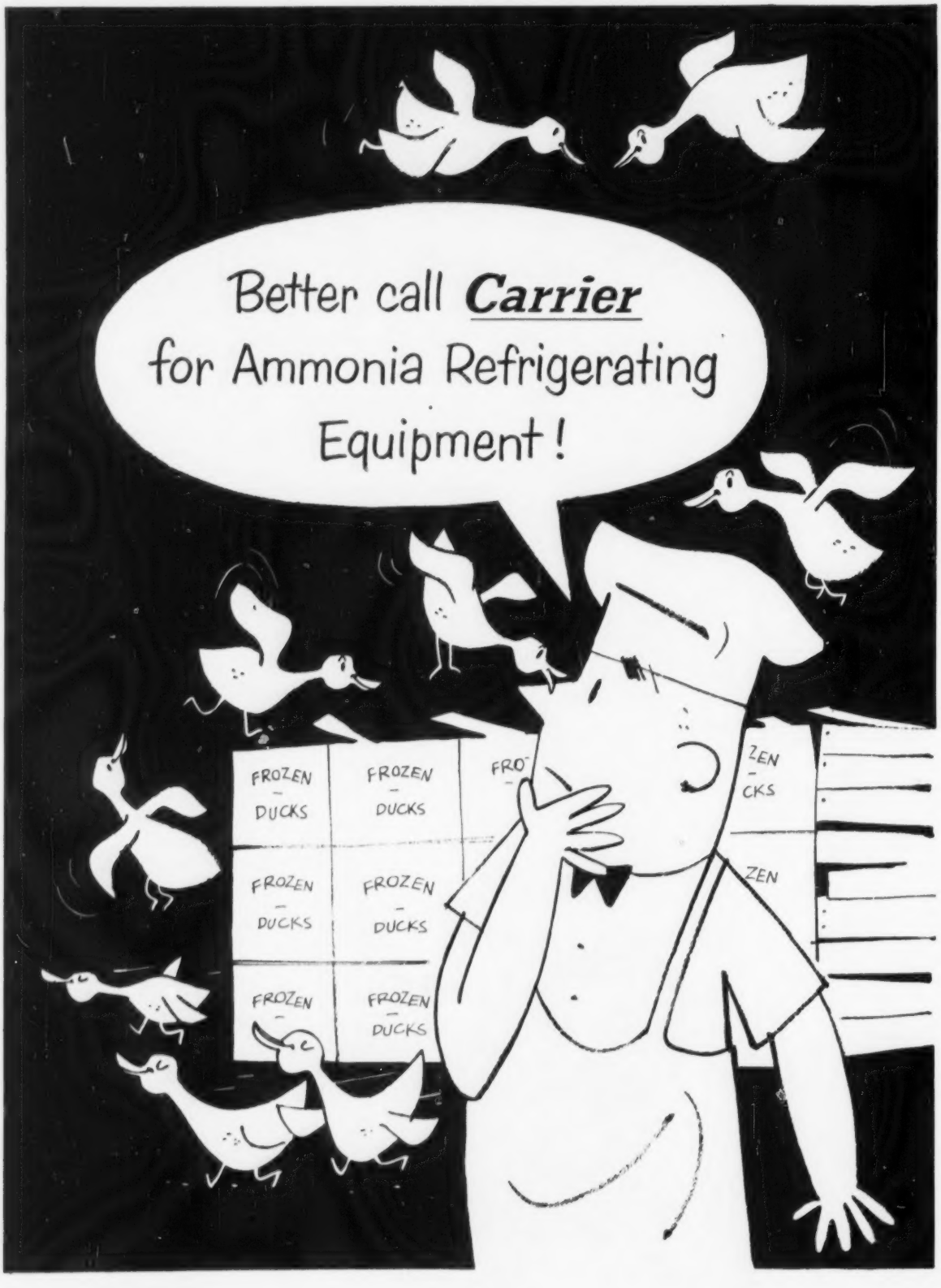


**Carrier** CARRIER CORPORATION, SYRACUSE, NEW YORK. OFFICES IN PRINCIPAL CITIES.



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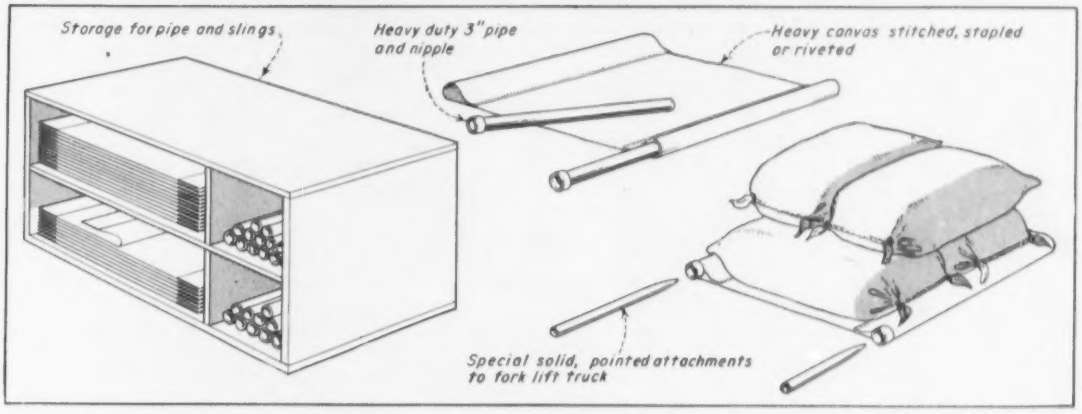
CUT OUT AND FILE

# PRACTICAL IDEAS


Storage for pipe and slings
Heavy duty 3" pipe and nipple
Heavy canvas stitched, stapled or riveted
Special solid, pointed attachments to fork lift truck

## Novel Pallet for Bag Handling

Where stacking of loaded pallets isn't required, the low-cost, efficient bag-handling pallet illustrated above may be utilized.

These pallets are fabricated from heavy duck or canvas, with seams at two sides into which are inserted heavy duty pipe.

In order to maneuver this type pallet, you merely fit your lift truck with special forks (preferably round in structure and pointed at the ends). These prongs go into the pipes encased in the pallet-seams, and thus the load is lifted and transported.

The lift pipes maintain their proper spacing for fork-truck transport when this pallet rests on the plant or warehouse floor. But this proper spacing is often lost when loaded pallets are stacked.

A very real advantage is that the canvas and pipes are easily separated into components and then readily stored in a very small space.—*FE Staff*

## Protects Drive From Overload

One of the sprocket and roller chain drives on a heavy-duty chain conveyor in our plant gave considerable trouble. Overloading (not always avoidable) caused frequent breakage of the chain. And on several occasions the motor was ripped from its base, its front legs broken off.

Shear pins promised to be a help but were unsatisfactory due to the work and time required to adjust the gear-head motor and heavy conveyor chain so as to line up the shear-pin holes.

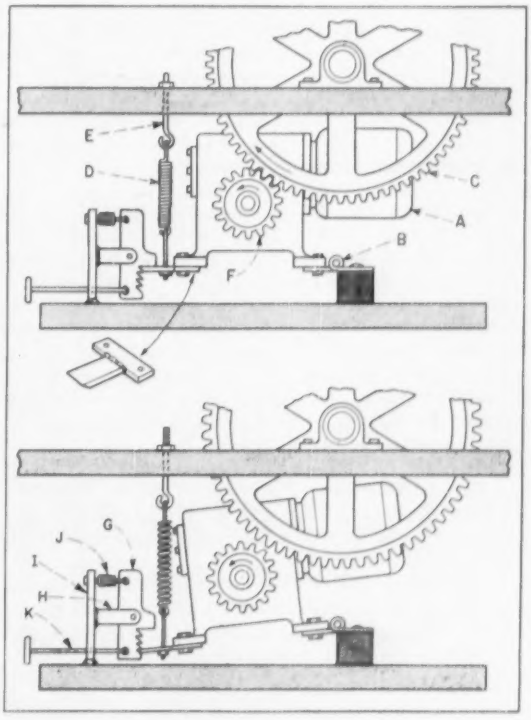
Then we finally worked out an arrangement that has functioned adequately—that is, drive motor gears that quickly disengage from the conveyor gears in the event of overload.

The gear head motor–(A) in sketch–was attached by hinge (B) to the footing nearest the drive gear (C). Instead of anchoring the other side of the motor, it was suspended from a heavy coil spring (D).

By tightening or loosening a nut on a long-shank eyebolt (E), tension of spring can be adjusted to required pressure for holding drive gear (F) of the motor engaged with the conveyor gear. An overload will force the gear to disengage and the motor assembly to drop against the spring tension.

To insure that the gear does not mesh again before the overload condition is corrected, a ratchet assembly was added.

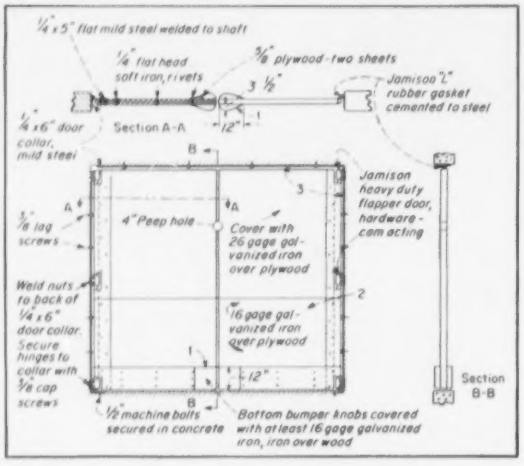
A notched ratchet plate (G), of ¼x1 in. metal, is



pivoted between two arms (H), which are welded to a ¼x2 in. strip (I). This strip in turn is welded in upright position to the channel iron base of the conveyor. The strip (I) is drilled near top and bottom for attachment of a ratchet piston spring (J) and a release handle (K) for manually disengaging the ratchet to remesh gears after the overload condition has been corrected.

When installing this assembly, there's one precaution: The motor must be mounted so that the gears drive away from each other. This gives the motor gear a better chance to drop away from the large gear and be captured in the lowered position by the ratchet.

When the conveyor is again ready to operate, one need only pull the handle (K) to disengage the ratchet and mesh the gears.—*Peter Chapman, Buckfield, Me.*


¼"x5" flat mild steel welded to shaft
¼" flat head soft iron rivets
⅝" plywood - two sheets
3½"
Jamisco "L" rubber gasket cemented to steel
¼"x6" door collar, mild steel
Section A-A
12"
B
Jamison heavy duty flapper door, hardware - cam acting
A
⅜" lag screws
4" Peep hole
Cover with 26 gage galvanized iron over plywood
3
Weld nuts to back of ¼"x6" door collar. Secure hinges to collar with ⅜" cap screws
16 gage galvanized iron over plywood
2
1
12"
Section B-B
½" machine bolts secured in concrete
Bottom bumper knobs covered with at least 16 gage galvanized iron, iron over wood

## Strengthens Flapper Doors

Experience has taught us that besides having the panels of flapper doors strongly constructed so that they can withstand the impact and abrasion of fork trucks, it is also necessary to secure the doors to the frame in such a way that they will not fail at the bearing point.

Before considering framing details, however, it should be noted that the closer a truck strikes to the door bearings, the greater the impact on those bearings. As fork trucks sometimes make turns immediately before contacting the flapper doors, they have a tendency to hit the near-door close to its bearing.

In order to prevent this, all our flapper doors are equipped with bumpers protruding from the center and bottom of the door—so that even though the fork truck approaches the door at a slight angle, the load hits the center of the door.

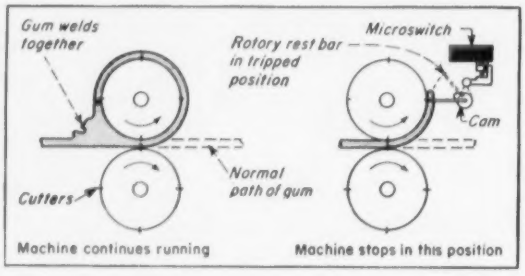
These bumpers—(1) in sketch—are of tear-drop design and protrude 3 in. from the door at the greatest point. Also, a 16-gage galvanized-iron protection plate (2) on lower part of door to insure longer door life.

We found that the weak point in flapper-door design was the bearings. The screws holding the bearings tended to detach, causing damage to the door framing. When these screws have been pulled out several times, permanent damage to the door results. This requires replacement of framing timber, which is time consuming and costly.

To solve this problem, we rigidly secured to the door-framing timber a series of 6-in.-wide, ¼-in.-thick steel plates (3), lining top and sides of the door frame with them. These plates are lag bolted, and they're also bolted tightly to the concrete floors on both sides of the door.

Hinges were then secured to the steel frame with ⅜ in. cap screws which, we have found, will "give" or strip before door or frame are damaged. In effect, the cap screws act as shear pins. Should they break away from the steel casing, they need only be replaced.

Doors are now heavy enough to withstand both the impact of fork trucks and the abrasion as truck and pallet move through them. This method of construction has considerably reduced the repair bills on flapper doors.—*P. J. Morrissey, Securities Warehouse & Cold Storage Co., San Jose, Calif.*




## Machine-Time Loss Cut 90%

At times, the chewing gum adheres to the cutters of our gum-scoring machine. When this happens, the gum may be carried around the roll a number of times before the operator notices the trouble and stops the machine to clean it off. Thus, considerable production may be lost before the trouble is discovered and properly remedied.

In order to avoid this, we have installed Microswitches No. BVE-2RN2 on each scoring machine. These are placed in conjunction with a rotating bar which is positioned at rest in front of, and extending the full length of, the roll. At the end of this bar, and fastened to it, is a face cam which will rotate and operate the Microswitch (see sketch).

Now, when a sheet of gum is carried only one quarter distance around the roll the adhering material will strike the resting bar, kicking it to approximately a 45-deg. angle. Then, as the bar rotates, the cam actuates the Microswitch to shut down the entire machine immediately.

Approximately 90% of the production time previously lost is now saved by using this type of Microswitch control on each machine.—*Joseph L. Hranisky, Production Engineer, William Wrigley Jr. Co., Chicago*

# TRI-CLOVER Pumps, Fittings and Valves protect Product Quality at CANADA DRY

Tri-Clover Sanitary Pumps help move 17 to 20 thousand gallons of liquid sugar daily from dissolving tanks to processing tanks at Canada Dry's new plant.

## Maspeth, Long Island Plant..... a modern marvel of sanitary production

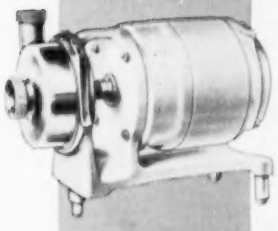
To quote R. W. Moore, President of Canada Dry Ginger Ale, Inc., their huge new bottling plant at Maspeth, N.Y., is *"equipped for the highest degree of automation which is presently possible in soft drink production."*

Canada Dry knows that continued customer satisfaction and repeat order business depends on the constant high quality of their bottled product. That's why they chose Tri-Clover sanitary centrifugal pumps and stainless steel fittings and valves for their liquid conveying lines. These vital elements stand permanent guard against corrosion and product contamination.

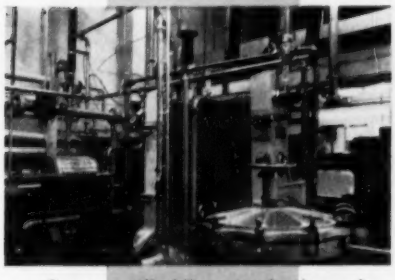
For pumping applications, Tri-Clover has a full line of centrifugal pumps designed to handle any product that will flow to them.

Tri-Clover sanitary stainless steel fittings and valves are available in standard threaded types or in the new Tri-Clamp design for both "cleaned-in-place" and "take-down" lines.

In building a new plant or modernizing an existing one, our engineering staff can help you solve your liquid conveying problems. For further details on the Tri-Clover complete line, write for literature.



One of a complete line of Tri-Clover Centrifugal Pumps. Full details on these modern efficient units are contained in the Tri-Clover Sanitary Pump Catalog 253. Write for your copy.



Compact "flash" pasteurization unit makes extensive use of Tri-Clover stainless steel fittings, valves and pumps.

**LADISH CO.**
*Tri-Clover Division*
*Kenosha Wisconsin*

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# BOOST PRODUCTION

"Fudgsicle" processor prevents foam, minimizes rejects with Antifoam AF Emulsion.

## stop waste with a Silicone Defoamer

**YOU KILL FOAM FAST,** increase productivity, stop wasteful and unsanitary boil-overs or spillage when you use a Dow Corning Silicone Defoamer. Physiologically harmless, water dilutable Antifoam AF Emulsion may be used in processing nonstandardized foods at concentrations up to 34 ppm; Antifoam A Compound up to 10 ppm.

Effective in remarkably low concentrations, Dow Corning Silicone Defoamers are the most versatile and economical foam killers ever developed for food processors.

**For example—**

**In Chocolate Syrup**
1 oz Antifoam AF per 2075 lb.

**In Dill Pickling Solution**
1 oz Antifoam AF per 15,625 lb.

**In Vitamin B2**
1 oz Antifoam A per 35,000 lb.

**In Chewing Gum Base**
1 oz Antifoam A per 20,833 lb.

***Free Sample*** *—make your own test — send coupon today*

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Dow Corning Corporation
Midland, Mich., Dept. 5513

Please send me:
FREE sample of ☐ Antifoam A Compound
☐ Antifoam A or ☐ AF Emulsion;
☐ Booklet on Silicone Defoamers.

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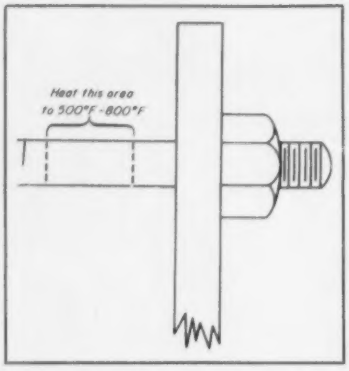
## *Practical Ideas*

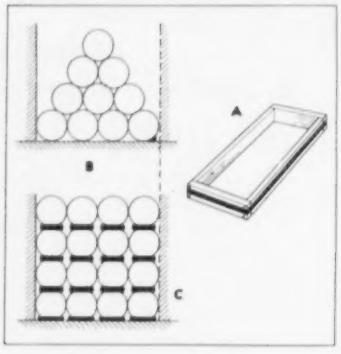



### To Take Up Tie-Rods

Here's a way to expedite the tightening of tie-rods:

Choose an area on the rod (see sketch) close to the nut to be tightened. Then, heat this area with an oxyacetylene torch. This will cause the rod to expand and permit tightening of the nut.

The tie-rod is thus tightened as it cools.—*"Linde Tips," Linde Air Products Co., New York City.*



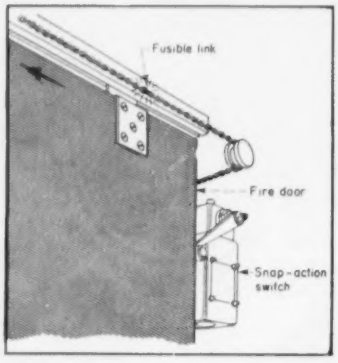

### Better Way to Store Drums

If you're cramped for space, here's a simple way of using specially designed pallets to store more drums in limited floor space.

Open-type (top and bottom) pallets are constructed of four 2x4's nailed and steel-strapped together—(A) in sketch. Each pallet is designed to lie saddle-fashion over one drum while supporting another above it.

In contrast, the conventional way of storing drums, one on top of the other (B), results in loss of vertical storage space with each layer of drums stacked.

However, the saddle-type pallets (C), permit storage of 60% more drums in the same floor space. Only difference is that slightly more vertical space is needed to make up for space occupied by the pallets.—*FE Staff.*




### Automatic Fire Alarm

We have a safety arrangement whereby a fire near any fire-door in our plant will melt a fusible link in the door's counterweight chain, and so close the door. However, such a fire may not be immediately discovered, and as a result might gain undue headway.

To avoid this possibility, we mounted a Microswitch (sketch) so that the actuator is held depressed by the open door. Thus, should a fire melt the link and close the fire-door, the Microswitch is released, actuating the entire plant alarm system.—*C. E. Roddick, Washington, D. C.*

### "Package Film" Belting

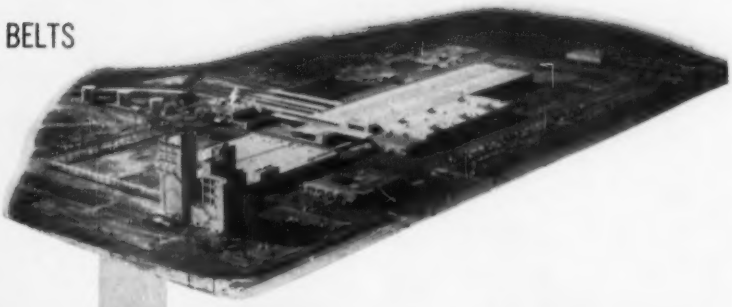
Mylar polyester film—fast growing in popularity for packaging—has now also proved effective as conveyor belting for specific functional purposes. And even in paper-thin layers.

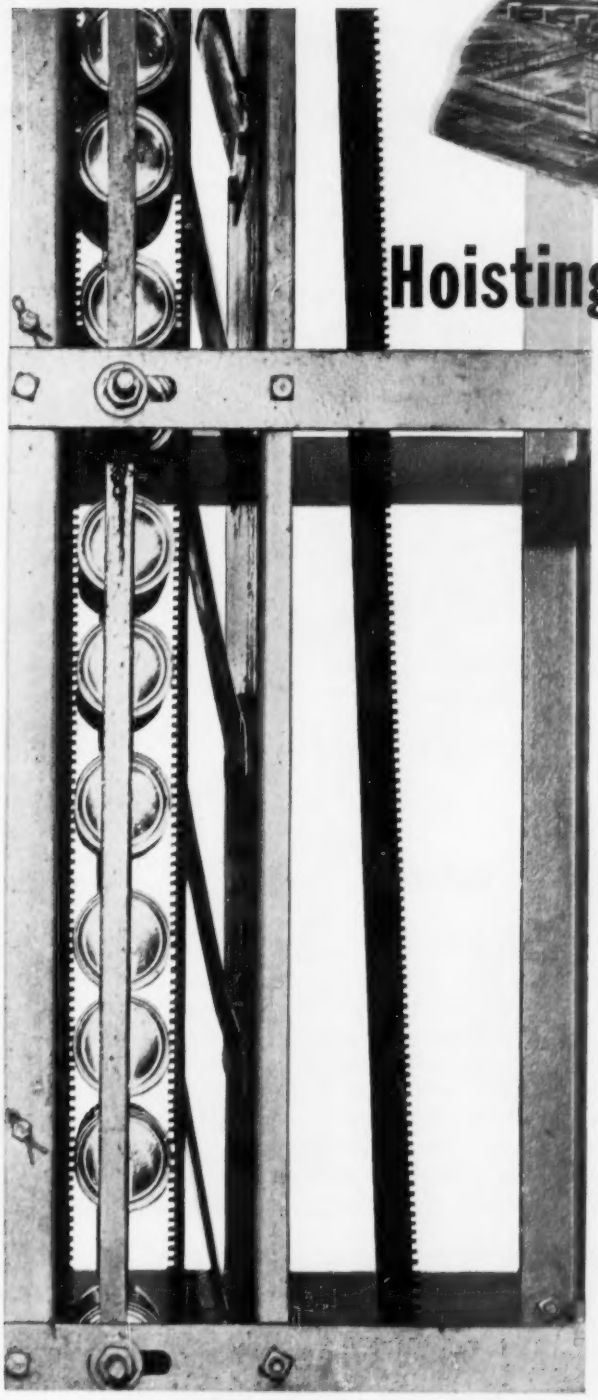
Versatility of Mylar is borne out by the accompanying table of properties (on p. 49).

On one conveyor at Stephen F. Whitman & Sons, Inc., Philadelphia, plaques made of two thin layers of this film versatile, carry chocolate candy from enrober to cooling tiers. Smooth surfaces of these plaques allow easy cleaning.

Furthermore, bakeries—Bond for one—now use belting of Mylar

**STEEPGRADE** CONVEYOR BELTS





# Hoisting Millions of Beers–

## straight up – with never a slip

At this giant Anheuser-Busch brewery, this pair of U. S. SteepGrade Conveyor Belts lifts 16 oz. cans of beer *at a 90-degree angle.*

"No other belt could have accomplished better performance. It's nothing short of spectacular," says the manager of the brewery.

As the 1-lb. cans come from the pasteurizer slippery and wet, they roll onto the vertical can conveyor where SteepGrade carries them straight up and onto an incline to the carton-filling machine. Cans don't slip at all, even when the conveyor is stopped.

The secret is SteepGrade's exclusive "gripper cleat" construction—a molded, integral part of the belt itself. These thousands of "gripper cleats" hold the cans firmly, yet gently. This means far less pressure, far less belt speed is required. Damage to cans and print smearing is eliminated. And the more efficient operation saves electric power, lengthens belt life.

This remarkable materials-handling solution came as a result of U. S. Rubber's Three-Way Engineering service: "U.S." belt engineers worked closely with the designer of the conveyor system and the plant engineer.

This service—plus a complete line of conveyor belting for any materials-handling problem—is obtainable at the 28 "U. S." District Sales Offices, or contact us at Rockefeller Center, New York 20, N. Y. In Canada, Dominion Rubber Co., Ltd.

Close-up of one of the vertical can conveyors. Note how evenly spaced the cans are, how slight is the pressure being exerted against the cans by the belts. This, despite the fact that when the picture was taken, *the belt had been stopped for more than a minute.*

**Mechanical Goods Division**

# United States Rubber



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# New Quaker Oats Company Research Center

## A promise of still better products for you

Here you see the outside of the John Stuart Research Laboratories just opened by The Quaker Oats Company at Barrington, Illinois. What goes on *inside* you'll discover in the finer quality of all the products you get from Quaker.

Product research is far from new at Quaker. It is one of the fundamentals of sound business that introduced such important developments as cleaner corn through the electrostatic cleaning process—more manageable barley through enzyme inactivation—and many others.

Now research of this type will get a fresh boost in the new John Stuart Research Laboratories. Here 88,000 square feet, the latest in scientific equipment, and more than 100 scientists and technicians work to maintain the high quality of Quaker products—spearhead the search for new and improved processes—conduct the basic studies that lead to new and better products.

If you use any type of flour or cereal product in your production process—why don't you get in touch with Quaker. Chances are there is a Quaker product or processing development that can help to make *your* product better or at a lower cost. Contact The Quaker Oats Company, Industrial Sales Department, Merchandise Mart Plaza, Chicago 54, Illinois.

**QUAKER**

The Quaker Oats Company, Chicago 54, Illinois

for conveying products such as doughnuts. Its suitability here is based on its strength and surface resistance to oils and greases.

At Goldberg Candy Co., Philadelphia, use of this material for thin conveyor belting makes for a glossy finish on the chocolates traveling from enrober to cooling tunnel. This polyester belt is 128 ft. long. It's unaffected by temperature changes.—*FE Staff*

**PHYSICAL PROPERTIES OF MYLAR POLYESTER FILM**

**Tensile strength**
**17,000-25,000 psi.**
**Impact strength**
**70 kg. cm./mil**
**Tear strength**
**18g./mil (after tear is started)**
**Flex life (deg. F.)**
**20,000 cycles**
**Elongation (Break)**
**70-130%**
**Shrinkage**
**1-2% at 150C.**
**Water vapor permeability**
**110g./100 $m^2$/hr./mil**
**Oxygen permeability**
**0.90g./100 $m^2$/hr./mil**
**Solvent and oil resistance**
**Excellent**

## Sanitary Tile-Type Shelves

When planning our new syrup room several years ago, every consideration was given to sanitation of tile walls and floors, also all equipment of stainless steel or glass.

However, one problem presented itself: Where and how could we store the many bottles of flavors that would be needed daily?

Since space was at a premium, a metal storage cabinet was ruled

**Tap your own hot-water line for high-power cleaning . . . with the new Oakite SANISEPTOR**

Oakite SANISEPTOR is made of 14-gauge seamless cold rolled steel. Mixing chamber and injector parts of brass and bronze. Holds 15 lbs. of detergent. Three hose nozzle tips furnished to handle different requirements.

A hot-water faucet and an Oakite SANISEPTOR – that's all you need now for mechanized sanitation on a plant-wide basis.

No pump, motor or steam supply. Use the pressure in your hot-water line to power the Oakite SANISEPTOR. Just fill the unit with concentrated Oakite detergent, hook into your nearest hot-water faucet . . . and that's all! A twist of the valve sends a jet-stream of hot detergent solution wherever you aim it. Twist another valve and you get instant rinsing action. Use it for speedy sanitation of tanks, vats, equipment, floors, walls, hard-to-reach places – everywhere in the plant. Weighs only 25 lbs. Eliminates ladder, bucket and brush, dangerous climbing.

Ask your local Oakite Technical Service Representative to demonstrate the new Oakite SANISEPTOR, or write for free illustrated folder. Oakite Products, Inc., 26G Rector Street, New York 6, N. Y.

OAKITE

Export Division Cable Address: Oakite

Technical Service Representatives in Principal Cities of U. S. and Canada




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# UNIFORM FAST FREEZING

## WITH *Cambridge*

## WIRE MESH CONVEYOR BELTS

Regardless of what you're freezing, you'll get a more uniform product by washing, blanching, cooling and freezing at controlled speed on continuously moving wire mesh belts. Open mesh permits free circulation of steam for uniform blanching and cold air for faster freezing, provides rapid drainage of wash water and steam condensate. Write for these detailed discussions of how Cambridge Wire Mesh Conveyor Belts can speed production by minimizing manual handling.

**No matter what food or process . . .**

. . . canning, freezing, baking . . . meat, poultry, candy, fruit or produce . . . Cambridge Wire Mesh Conveyor Belts can reduce your operating costs and increase product quality by continuous uniform processing with reduced manual handling. Lifelong rust-protection, quick drainage of process solutions, lack of odor and freedom from contamination are only a few advantages. All-metal belt is impervious to damage from heat and cold. There are no sharp edges because Cambridge belts are woven from round wire.

Cambridge Wire Mesh Conveyor Belts are made in any size, mesh or weave, and from any metal or alloy. Special raised edges or cross-mounted flights are available to hold your product during movement.

*Call in your Cambridge Field Engineer to discuss how you can cut food processing costs by continuous operation. You can rely on his advice. Write direct or look under "BELTING, Mechanical" in your classified telephone book.*

**ASK FOR FREE 130-PAGE REFERENCE MANUAL illustrating and describing wire mesh conveyor belts. Gives mesh specifications, design information and metallurgical data. Ask for Special Industry Folder on your operation.**

**The Cambridge Wire Cloth Co.**

WIRE CLOTH | METAL CONVEYOR BELTS | SPECIAL METAL FABRICATIONS

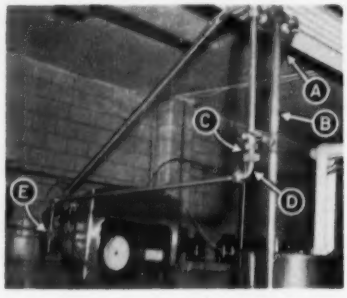
DEPARTMENT Q, CAMBRIDGE 1, MARYLAND

OFFICES IN PRINCIPAL INDUSTRIAL CITIES

## *Practical Ideas*

out. And so, shelves were almost mandatory. However, conventional shelves, supported on metal brackets, did not fit into our concept of sanitation.

The problem was solved (see photo) by specifying shelves made of tile similar to that used on the walls. These shelves, which were constructed at the time the walls were faced, have proved very satisfactory. They are wide enough to hold gallon bottles, do not absorb spilled liquids, and are easily cleaned by hosing.—*Jack Levin, Superintendent, Sweetie Beverages, Inc., Philadelphia.*




### Cutting Operating Costs

Because of the large number of flavors we prepare daily, it's proved advantageous to make up flavor syrups in small batches.

So when our syrup room was remodeled several years ago, we installed ten 50-gal. tanks, instead of a smaller number of larger ones, in order to facilitate our batch procedures.

We make up a plain syrup (from liquid sugar) in two 500-gal. tanks in an adjoining room, then pump it to the syrup room. Here, it is pasteurized in a Creamery Package plate-type heat exchanger, equipped with slow diversion valve to insure sterility. Then it is cooled in the same unit, filtered, and piped to the small tanks, where flavor is added.

A conventional piping arrangement would have comprised a line running above the ten flavor tanks, with 3-way valves and short pipe sections to the top of each. But from previous experience we knew how much time it would require daily to take down, clean, and put up such a system.

Accordingly, we devised this simpler hookup—and it has cut cleaning time to a minimum:

Stainless line—(A) in photo—



← For more data, circle this page number on card at back

## New pipe insulation goes on fast in one operation

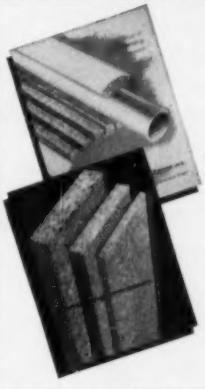
The speed with which Armstrong LT Cork Covering goes on low-temperature pipes results in substantial time and labor savings. This new kind of insulation is made of cork segments adhered to a backing of asbestos paper and aluminum foil laminate that seals out moisture and resists fire. Fast application requires only cementing the flap in place and sealing the end joints with vaporproof tape. There are no wires or bands needed, no cloth, twine, or paper to be wrapped around the insulation, and no vapor barrier to apply.

A highly efficient insulation for all low-temperature piping, LT Cork Covering is only one of the many quality products in the Armstrong line. A complete contracting service, geared to install these insulations economically and efficiently, is also available. Free booklets give full details. Check the ones you want in the coupon below.

Armstrong

**INDUSTRIAL INSULATIONS**

*for temperatures from –300° F. to 3000° F.*



☐ Armstrong LT Cork Covering, for all low-temperature lines

☐ Armstrong Corkboard, for all low-temperature rooms

† Trade-Mark

☐ Armstrong Armaglas* Insulations, for low-temperature rooms

☐ Armstrong Armalite†, a new, lightweight insulation for cold rooms

**Armstrong Cork Company**
**2001 Seventh St.**
**Lancaster, Penna.**

Please send me the free booklets checked. ☐

Please have an Armstrong representative call. ☐

Name .....

Position .....

Company .....

Address .....

City ..... Zone ..... State .....

* ® Armstrong Cork Company, manufactured for Armstrong by Owens-Corning Fiberglas Corp.

# New

## Cherry-Burrell "Uni-Seal" Valves simplify sanitary valve maintenance

Install new Cherry-Burrell Uni-Seal valves and forget about valve plug maintenance. No more galled and scored plugs . . . no more costly machining of seating surfaces to assure tight flow control . . . no more need to return valves to factory for reconditioning or plug replacement. Here's why:

- ***New Uni-Seal rubber-covered*** cast alloy plug does not gall or score.
- ***New Uni-Seal rubber-covered*** plug unaffected by cleaning solutions.
- ***New Uni-Seal rubber-covered*** plugs are interchangeable—one plug fits every valve of like size.
- ***New Uni-Seal rubber-covered*** plug can be changed—simply and quickly—without removing valve from line.

Available in 1", 1½" and 2" plug-type Cherry-Burrell stainless steel valves. Ask your Cherry-Burrell Representative for the story and *try them now!*

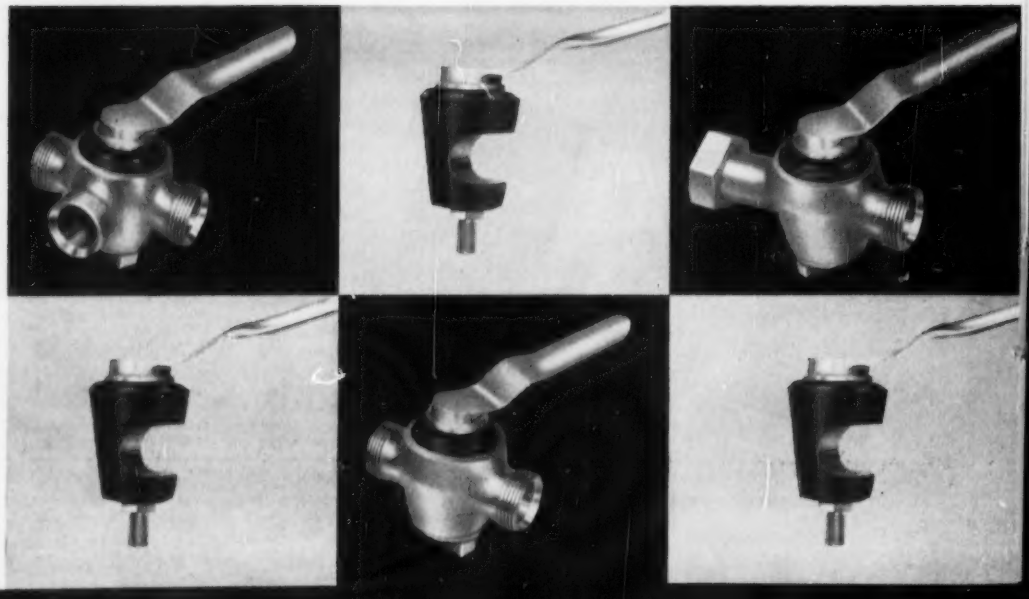
**CHERRY-BURRELL**
**CORPORATION**

427 West Randolph Street, Chicago 6, Illinois

*Dairy • Food • Farm • Beverage • Brewing • Chemical Equipment and Supplies*

SALES AND SERVICE IN 58 CITIES — U.S. AND CANADA

## ONE UNI-SEAL PLUG FITS ALL THESE VALVES

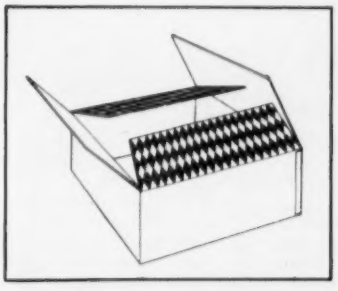


rises from syrup filter and leads to pipe support (B), located in the center of the flavor tank area (approximately the same distance from each tank). The sanitary line held rigid by the support parallels it to a swivel joint (C), which connects with a sanitary bend (D).

To this latter unit is attached a length of stainless tubing sufficient to reach above the top of any flavor tank. Another right angle bend, to which is attached a sanitary Hills McCanna valve (E) and two short nipples, complete the hookup.

With this arrangement, syrup can be diverted to any flavor tank by simply moving the horizontal pipe so that the outlet valve is over desired tank.

Thus, instead of many assemblies, only one is now required. Also, capital cost is low. Further, it takes only a few minutes to disassemble, clean, and return this line to its place. —*Jack Levin, Superintendent, and Stanley Sabalauskus, Maintenance, Sweetie Beverages, Inc., Philadelphia.*



## Case Opening Made Easy

About a year ago, our organization, Igleheart Bros., division of General Foods, began receiving complaints from salesmen that its shipping cases were too difficult for grocers to open.

Apparently, we were doing too good a job of gluing them closed. So we contacted our Manufacturing & Engineering Dept., which then tackled the problem of an easier-opening case.

After considering several types, it was decided that adapting our present case was most practical. The case had to retain the necessary strength to protect the product, despite being of simpler access.

Solution we adopted was the printed diamond feature. Thus, a series of diamonds are reproduced


# At last! Positive way to SOLVE INSTABILITY of food emulsions -- 7 MONTHS OR MORE!

**KELCOLOID** hydrophilic colloid

KELCO REFINED ALGIN PRODUCTS

lengthens shelf life of French and Salad dressings, meat and barbecue sauces

You produce stable and uniform emulsions of superior flavor release and natural color with Kelcoloid. This easy-to-use hydrophilic emulsifying colloid improves consistency, gives smoother textured dressings of higher gloss.

*for French dressings:*

Extensively used in French dressings, Kelcoloid gives greater emulsion stability and markedly increases shelf life. Even when dressings are subjected to either high transit and storage temperatures, or refrigeration, Kelcoloid protects against body breakdown and separation.

*for salad dressings and food spreads:*

For softer, smoother texture add Kelcoloid to produce a desirable body that resists cracking and oil separation even on long standing.

*for barbecue, meat, seafood, and mustard sauces:*

With Kelcoloid you produce a properly stabilized product with optimum body and clean full flavor. Shelf life is increased for Kelcoloid maintains uniform emulsions longer.

For finer food emulsions Kelcoloid is well worth your immediate evaluation.

**YOURS ON REQUEST:** Free Kelcoloid Sample and Technical Bulletin, fully describing application of Kelcoloid in food emulsions, yours without obligation. Write today.

**KELCOLOID®**
a product of **KELCO** company

120 Broadway, New York 5, N. Y.
20 N. Wacker Drive, Chicago 6, Ill.
530 W. Sixth St., Los Angeles 14, Calif.
Cable Address: Kelcoalgin—New York

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**DAY JUMBO MIXERS . . .** meet every requirement for maintaining a thorough blend of doughnut mixes under sanitary conditions at Krispy Kreme Doughnut Corp., Winston-Salem, N. C. For instance: seals may be furnished of sanitary construction requiring no packing, and of such simple design as to permit thorough cleaning in a matter of minutes between batches—(no more black specks working into product from stuffing boxes).

Outboard bearings on all models allow plenty of room for normal cleaning and maintenance. Special agitators available for blending high shortening content products. Heating or cooling jackets, dust covers and many other optional features available. For complete information write for Bulletin 800.

*in mixing equipment* FOUNDED 1887 **DAY** *means longer life span*

**THE J. H. DAY COMPANY**

Division of Cleveland Automatic Machine Company
4924 BEECH ST., NORWOOD, CINCINNATI 12, OHIO

*Quality equipment for baking, paint and varnish, printing ink, chemical, rubber, pharmaceutical, cosmetics, paper and pulp, explosives, food, ceramics, candy, soap, sugar and milk products.*

**Mexico:** T. de la Pena e Hijos. S.A., Nazas 45-A, Mexico 5—D.F.


## *Practical Ideas*

on the outer surface of the inner top flaps of the case (see sketch).

These printed diamonds alternate with unprinted diamonds, giving a cross-hatch effect. And the ink covers only half the surface to be glued.

Principle of this opening feature is simple: Glue doesn't adhere effectively to the inked surface. So by covering half of the gluing area with printing ink, we reduced the effective gluing area by one half and, consequently, substantially reduced the effort required to open the container.

Alternating printed and unprinted surfaces arranges the points of adhesion in a manner that fastens the flaps firmly across the surface.

Now in use more than a year, this feature has been fully tested under shipping, handling, and warehousing conditions. And it has proved more than adequate, comments from salesmen indicating that grocer reaction has been favorable.

This, coupled with the fact that the cost of our cases has remained the same, brings us to believe that we have found a most satisfactory answer to our problem.—*Technical Bulletin, General Foods Corp.*

### CAN YOU USE $50?

**Then here's a chance to get it: Send one of your ideas to FOOD ENGINEERING.**

**Each month $50 is presented to someone like you for the best item in this department. And the chance that it will be you is now running about one in twelve.**

**Also $5 to $15 is paid for each contributed item used. So a few minutes time may net you as high as $65.**

**Just send us the facts about your idea and its application. And include a free-hand sketch or snapshot to illustrate it.**

**We'll do the finished writing and drawing for you.**

**Send it today, before you forget. Address it to Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.—The Editors.**

**NOVEMBER PRACTICAL IDEA WINNER was "Spring-Loaded Truck Bumpers," sent in by Virgil Keith, Engineer, Midwest Dairies, Centralia, Ill.**

# THE NEW SEALKAN SHIPS FLAT*

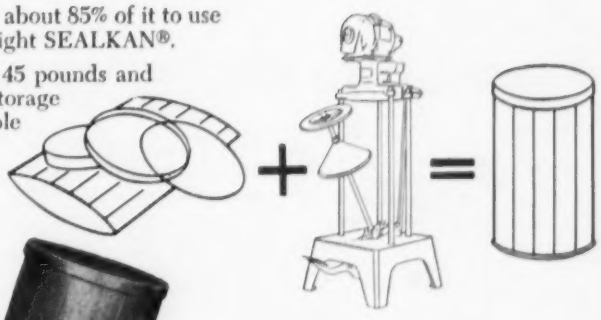
*Over 30,000 In Each Carload

## COSTS LESS TO BUY...TO SHIP...TO STORE...TO HANDLE

Take a look at YOUR warehousing space. Like to have about 85% of it to use more productively? You can if you switch to the Sealright SEALKAN®.

SEALKANS are available in sizes ranging upward to 45 pounds and are shipped flat. They take up only about 15% of the storage space demanded by old-fashioned containers. Assemble only the number you need at the time you need them.

And your salesmen will welcome the many new customer benefits that characterize this superb paper container that can be handled so easily and disposed of so efficiently. Get all the information.



We use SEALRIGHT SANITARY SERVICE for Your Protection

*Just write*

**Sealright**

Oswego Falls Corp.—Sealright Co., Inc., Fulton, N. Y.—Kansas City, Kansas—Sealright Pacific Ltd., Los Angeles, California—Canadian Sealright Co., Ltd., Peterborough Ontario, Canada.

SEALRIGHT CO., INC., Fulton, New York
Please send me full details of New Sealkan. FE 157

Name ..... Title .....

Company .....

Address .....

City ..... Zone ..... State .....



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# What's Ahead in 1957 Depends on You

Our industry gets more exciting and challenging year by year. And as the turn of time brings us to the threshold of 1957, one must alert himself to the pace and direction of the progress that lies ahead.

That business was good in the industry last year—and should be better this year—has been pointed up in the Trends & Forecasts department. But that picture is for the industry as a whole. What 1957 portends for your company is something else. The opportunity is there to forge ahead of the pack by recognizing the signs and steering your business by them.

**Double challenge in 1957**

Two key factors stand out as we look ahead. One is the still higher consumer-income level anticipated, with a willingness to spend more for quality and convenience foods. This presents a chance to depart from the traditional price approach to the mass market. It is a challenge to peddle products with superior taste and convenience—with enough extra value added by manufacture to provide a better profit margin. Never has this opportunity presented itself to so great an extent.

The other key factor in your future is the "life-or-death" need to minimize unit processing costs. This must be done to offset the inevitable higher wage rates and salaries, the increased cost of transportation, and the higher supply and ingredient prices.

It is a must because the pace-setters with whom you compete plan to do it. They're going in for more so-called "automation"—not only in the plant and the warehouses, but in the offices as well.

If you don't intend to keep up with the modernization trend, you better start looking for someone to buy you out before your sales and profits become liabilities instead of assets.

**Never so many new "tools"**

The tools for higher efficiency never were so plentiful as now. If you have attended any of the major food and packaging equipment shows in the past year, you will have noted a significant increase in the number of new and improved machines introduced.

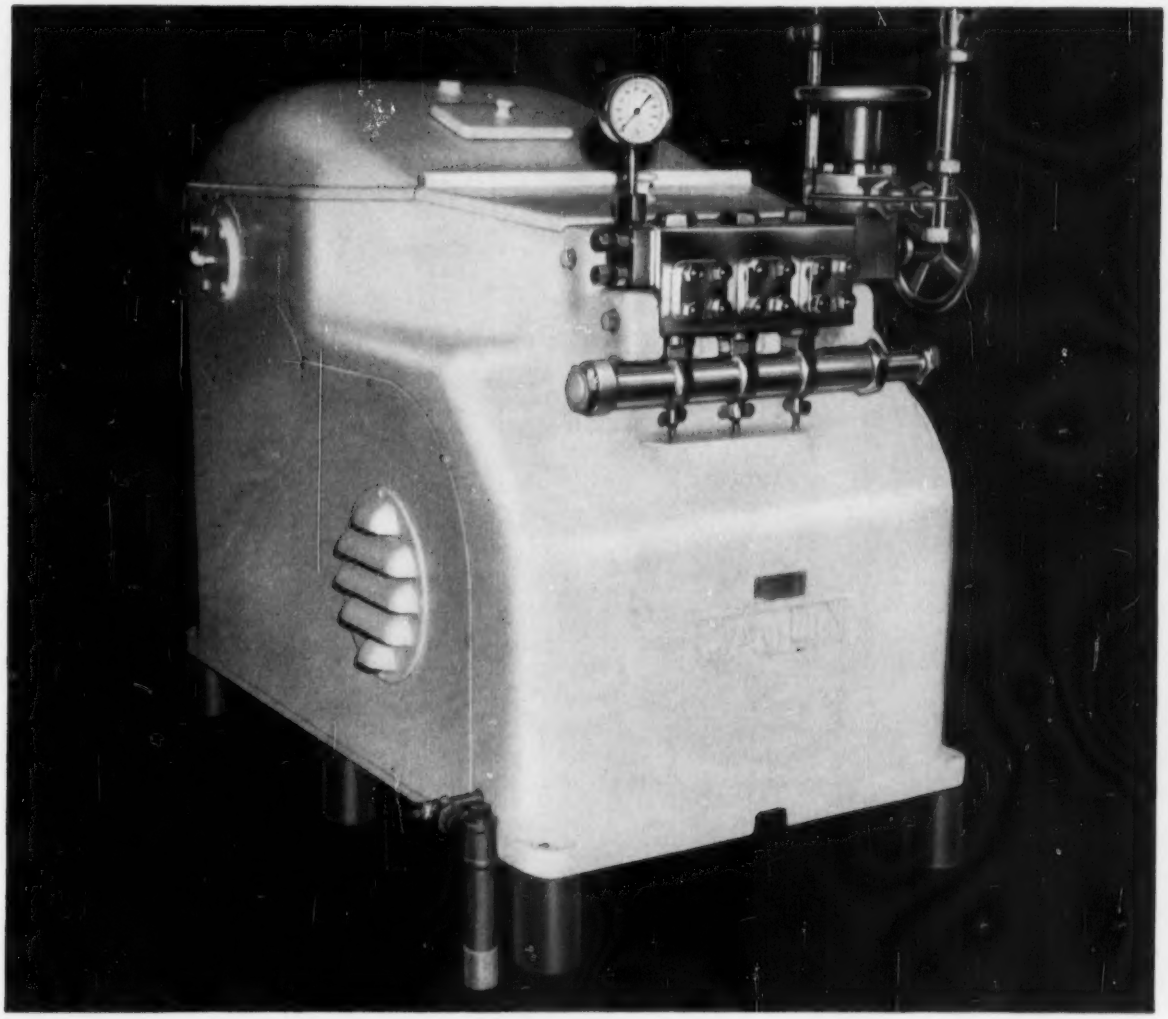
There has been a long-needed awakening of the equipment manufacturing field to the needs of our industry and to the opportunities that it offers.

The result is an upsurge in advanced food-machine engineering the like of which has never before been seen.

You can say a loud "hurrah" for that. The traditionally slow rate of improvement has been a millstone around the industry's neck throughout history.

Now you are getting some real help—not only from old-line food machinery people, but from others who never looked at the food field before.

How much advantage you take of the new and better "tools" will determine to a great extent where your company stands as this new year comes to a close.



Syrup for a well known soft drink is pumped through this homogenizer at the rate of 1500 gallons per hour. Stainless is used wherever the product touches metal. Manufacturer: Manton-Gaulin Mfg. Co., Inc., Everett, Mass.

# STAINLESS isn't only glamorous...

Bottlers, for example, choose stainless steel, not because it's shiny and glamorous, but because it's an essential working tool. Using stainless helps assure a flavorful, zippy, pure drink because:

**STAINLESS resists corrosion during the bottling process.**

**STAINLESS leaves foods strictly alone. It eliminates the possibility of metal ion contamination.**

**STAINLESS fights abrasion and erosion.**

**STAINLESS is strong.**

They're all good reasons why stainless is your best choice for any type of food processing equipment. And, while stainless does the tough, unglamorous jobs more efficiently, it can also turn your plant into a sparkling showplace. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

**CRUCIBLE** first name in special purpose steels

## Crucible Steel Company of America

Canadian Distributor — Railway & Power Engineering Corp., Ltd.



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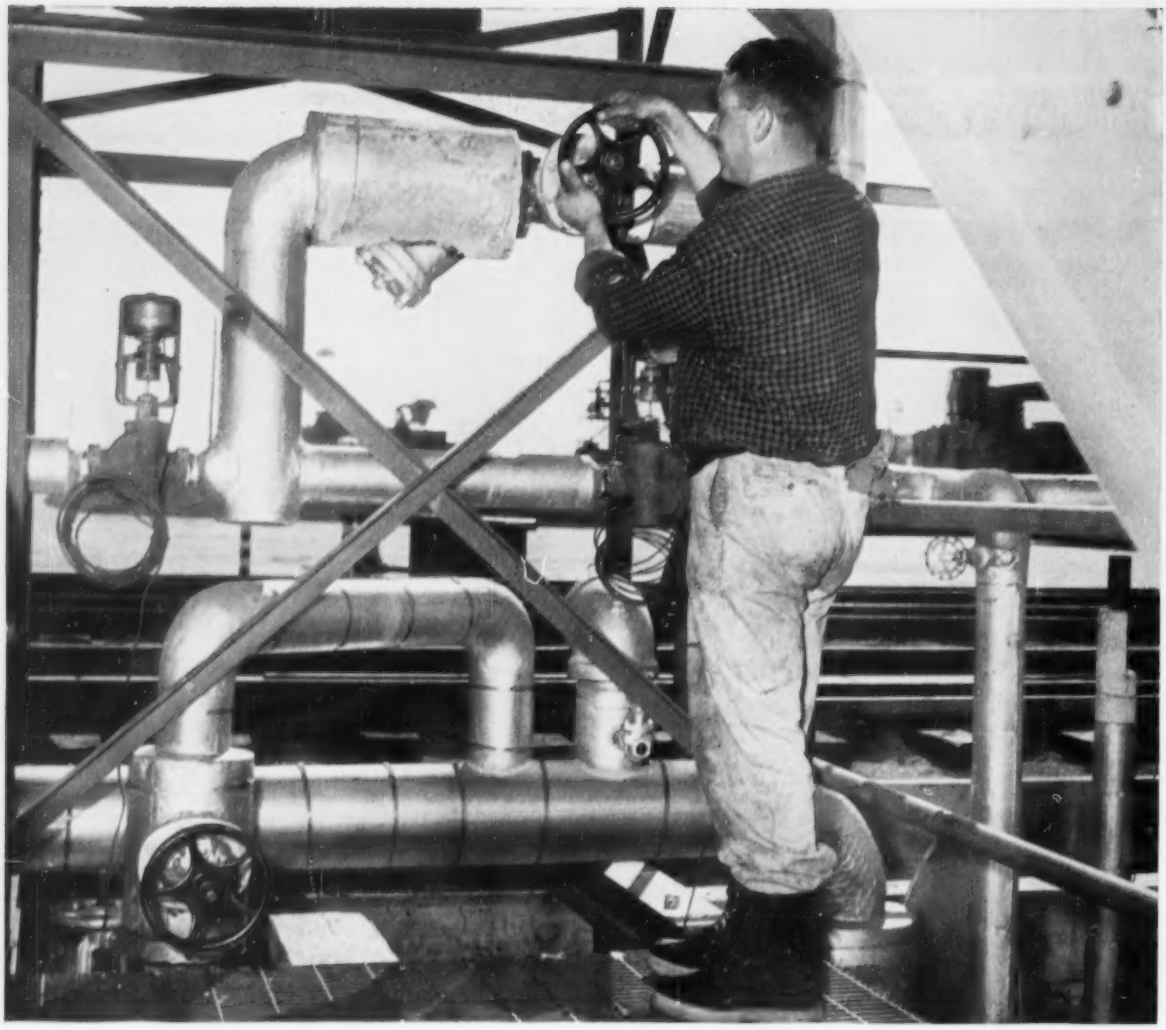


# His job is to wash tank cars . . . not to contaminate them

Even a good washer can contaminate a product tank car unknowingly – it all depends on the valves in the washing system.

But that doesn't happen at the Memphis emulsifiers plant of the Atlas Powder Co.

Here, Crane 18-8 SMo stainless steel valves are preventing corrosion and resultant iron pickup from getting into aluminum or stainless steel cars in washing. Such impurities could mean a lot of spoiled product when the cars are loaded.

After more than a year's service on hot detergent solution, the Crane alloy valves show no corrosive effects, and there's no record of damage from iron contaminants. With no maintenance whatever, the valves continue giving positive flow control.

New Crane alloy valves are helping all types of process industries with better flow control and higher contamination corrosion resistance at low cost. They offer many service features that can't be duplicated. Get full information from your local Crane Representative or write to address below. Ask for circular AD-2080.

**CRANE VALVES & FITTINGS**

**PIPE • KITCHENS • PLUMBING • HEATING**

*Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas*

**FIGURES TELL THEIR OWN STORY** on Supplee's graphic dollar-by-dollar income-and-outgo report board. As seen in this record of a recent year, a mere 2.1% remained for dividends and reinvestment.

# They Speak Right Out On Company Economics

**—And find it pays all along the line by winning employees, suppliers, customers, and the community to a healthier recognition of management's practices and problems . . . Program specifically boosts company's business, ups worker morale, improves hiring picture . . . Bias is nipped. And capitalism and free enterprise are bulwarked**

**IVAN C. MILLER**
"Food Engineering"

MANAGEMENTS of many organizations greatly fear what may happen if that Big Bad Wolf, "Specific Plant Economics," gets loose. And so they carefully avoid even a mention of the subject to their employees.

Even so, not all companies hold this view. One that definitely doesn't is Supplee-Wills-Jones Milk Co., of Philadelphia, a subsidiary of National Dairy Products Corp.

**Not only does this company take every opportunity to present the company economic picture to its employees and explain how capitalism and free enterprise function, but it also relays the same or similar messages to its farmer-suppliers, customers, and the local community.**

Highlighted here is how Supplee presents this simple, basic economic information without fear of having the program labeled as "propaganda" or "paternalism."

Shortly after they're hired, new workers are conducted through one of the company's plants "to acquaint them with production and, further, to apprise them of the company's economics."

Then, for the benefit of other company personnel, certain of these tours are pictorially reported in the employee magazine, *Supplee News*. Economic points are brought out in these reports. Thus everyone in the company has the opportunity to learn them.

The new employees on tour, and those who read *Supplee News*, were recently told that $23 million of the company's income (50.2¢ of each dollar) are paid out by the company for agricultural products. . . That $11 million (24¢ of each dollar) are paid to employees (some 2,300 of them) . . . And that the cost of supplies (bottles, caps, cartons, etc.) adds up to more than $6 million (13.4¢ per dollar of income).

Other outgo items cited, along

**CLEAR-CUT READABLE ECONOMICS** are featured (as circled above) in the employees' magazine. Other issues have run such articles as: "Bill Packard, Camden 'Sales, Stocks Up for the Future," and Annual Report Helps Youngsters Learn Business."

with per-dollar portion, were: Replacement and repairs (4.5¢), taxes and licenses (4.5¢), dividends (2.3¢), reinvestment for expansion (1.1¢).

**Public Told, Too**

On similar tours, approximately 10,000 visitors each year make the rounds of the company's largest and newest operation, the Tabor plant. They, also, "learn the fundamentals of dairy-plant operation and economics."

In groups ranging from 10 to 50 persons, educators, nurses, students, organization women, and homemakers take this plant trip. In the course of it, members of management, representing different departments, explain their own various specialties.

One company executive particularly mentioned that a "personality note" is injected in these tours. "When coming to production stations," he said, "we use the specific employees' names when describing the operations. We also have a few of them answer the visitors' questions about their jobs. This serves a dual purpose: It instills pride in the workers through recognition. Also it stresses the theme of our post-tour economic presentation, titled, 'People Make Our Business Tick.'

"Verbal tour explanations," he continued, "are supplemented by signs attached to strategic pieces of equipment. Not only do these identify the units and their use but they also exhibit the price the company paid for them. This provides a very concrete idea of one of the costs of doing business in the milk field. We find it a convincing prelude to the economic presentation which follows the tour."

This discussion of economics is specially shaped for three age levels —children of grade school age, high school and college students, and adults. Adults learn how the economics affect: (1) Customers, (2) employees, and (3) stockholders.

What each of these groups desires from the company is defined and outlined. First, it's pointed out that customers want quality products at fair prices, and that they expect satisfactory service. Then in the talk that follows, the company spokesman has a chance to cover Supplee products and quality.

He also has the opportunity to discuss state-controlled pricing of milk, the favorable comparison of the company's prices with the rise in price of all foods, and the caliber of service offered by the company divisions—retail, wholesale, and ice cream.

In explaining, second, what employees want, he mentions the desire for good working conditions and fair wages, pointing out the company's average wages and many of the employee benefits.

Emphasis is placed on the excellent company-union relations and the high percentage of employees who are members of the company 20-year club. This latter fact is used to illustrate both the stability of the organization and the fair treatment of its personnel.

Finally discussed is the stockholders' expectation of a fair return on their investment. Here, the factors of operating income, expenses, and net profits are used as illustrations.

Throughout, the Supplee presentations are made more graphic by the use of visual aids. Notable among the displays employed are an annual report board (such as used at management group meetings), and a special electrical exhibit that shows the expenses entailed in a quart of milk.

Both displays are in portable form, thus readily are carried about for use in presentation of the economics story in high schools.

The tour program has proved advantageous in a number of additional ways. The company finds that it has been of special value to the personnel department. For one thing, it's been an important factor in contacting and securing highly desirable college students for employment with the company.

Further, it has been adopted as a

training medium for both office employees and driver-salesmen.

Also, the Tabor-plant trips have aided the market research department in conducting taste tests of various products.

#### How Capitalism Is Explained

At least four issues a year of *Supplee News* stress the fundamentals of business economics, capitalism, and the free enterprise system.

In one issue, capitalism was pointed up, using as an example, "Capitalist Bill Packard," one of the employees at the company's Camden, N. J., plant. Titled "Camden's Bill Packard STOCKS UP for the Future," this is how the feature article reads:

"Let's take a look at a capitalist—Bill Packard, Camden driver-salesman. "Obviously, he doesn't fit the picture of a 'Wall Street Imperialist,' as painted by Communistic and other government-controlled economies. But nonetheless, he is a capitalist — and proud of it.

"Being a capitalist doesn't really make Bill any different from any other driver-salesmen, or plant worker, or company executive—or any other American, for that matter.

"The one thing that does distinguish him from many workers under our capitalistic system is that he has seen fit not only to apply his skill but also to invest his savings in private industry, the backbone of our economic system.

"Like more than 15 million investors from all walks of life—teachers, housewives, salesmen, laborers, clergymen, etc., he has exchanged his saved dollars for stocks—a stake in the industry of his country."

Skillfully introduced into the article are a number of economic points for the reader, such as:

. . . **"On the average, each job here at Supplee requires an investment of $6,400."**

. . . **"Brokers have set up installment plans for the purchase of stocks. For as little as $4 a week you can hold any of the 1,200 company stocks offered on the New York Stock Exchange."**

. . . **"Mutual investment funds provide an ideal arrangement for people who have neither the time nor knowledge to delve deeply into the market."**

. . . **"National Dairy alone has 64,000 shareholders, with no one person owning more than 2% of the total stock."**

. . . **"Many millions of people have directly become stockholders just by purchasing insurance or depositing money in banks—because the banks and insurance companies merely reinvest in industry the money which has been placed with them."**

. . . **"One out of every three investors today has an annual income of less than $5,000, and 75% of them earn less than $10,000."**

. . . **"Funds provided by the investments of stockholders assure the capital that a company like National Dairy must have to steadily grow through development of new products and improvement of manufacturing and distribution facilities. All of which adds up, in the final an-**

### Tips From Supplee's Program

SUCCESSFUL COMMUNICATION of your company's economics requires a specific program. And to implement such a program, and gain acceptance for it, takes much the same "doing" as any other communications activity.

Supplee's story—detailed in the accompanying feature—spotlights the noteworthy principles.

One basic rule is to crystallize your messages in terms of the people receiving them. It is human nature that these people's bed-rock interests are "me and mine." Hence, your appeal should directly relate to these specific interests of the individual or group targeted.

In short, your points have most impact when you choose illustrations that are familiar to your audience—those in which they can picture themselves. For example, use plant scenes and worker activities as the "framework" when addressing employees. Then gear the talk or text accordingly.

Considered alone your own interests as a corporation or as management are not of much concern to your employees. Rather, their thoughts center upon their own income and security, and their status with the company. But there is a definite bridge from "yours" to "theirs" in the fact that their security depends upon the security of the company. And it is over this bridge that communications can flow.

Of course, when you take the step of informing your employees on company economics, it's inevitable that they will ask questions. While some of these queries may be irrelevant, others no doubt will be quite pertinent.

Certain of them may even strike you as being *impertinent*—to the point where you may be muttering, "It's none of your business!"

True enough, some companies may tend to feel that they are put on the spot by certain questions. However, the true success of an economics-communication program is directly proportional to the management's willingness to face up to every question that can be reasonably considered.

**STRAIGHT FACTS** on what it all costs are posted for members of a businessmen's club following their plant tour. This dollar-closeup decidedly boosts their appreciation of the job Supplee is doing.

**alysis, to insurance against the disappearance of our jobs."**

Another issue of the employee magazine included a feature titled "Annual Report Helps Youngsters Learn Business". It told about the activities of Premier Products Co., a Supplee-sponsored junior achievement firm. And specially pointed out were the similarities of activities of the junior and the senior companies.

This comparison of the two again brought out points on Supplee's income and outgo.

Further, the feature "Vacations part of $728 Annual 'Hidden Income'", made clear the cost and value of all company-paid fringes. These include vacations, holidays, Blue Shield, Blue Cross, group life insurance, workman's compensation, retirement benefits, etc.

**To quote this article: "If each of us found an extra $14 added to our paycheck every week, it would be an extremely pleasant surprise, indeed. Yet, on the average, that's just how much 'hidden income' Supplee employees receive by virtue of benefits such as Blue Cross, Blue Shield, etc. Altogether, the amounts paid by the company for these benefits add up over the year to $1,610,000, an average of $728 per employee.***

**"Looking at it another way, if every one was paid on an hourly basis, he would receive an extra $35¢ per hour."**

#### Father-Son Example

Yet another way of presenting the firm's economics is illustrated by a company-magazine feature wherein Ed Molloy, one of the employees, is shown explaining the organization's earnings to his young son. The boy specifically learns how the economics of Supplee-Wills-Jones Co. compares with his own small week-end grocery-delivery "business."

Early paragraphs read:

**"This year, Ed decided to indoctrinate Eddie, Jr., in the workings of a large business. He reviewed Supplee's earnings report—so that young Ed could understand it in terms of his own week-end business.**

**"For like so many youngsters today, Ed, Jr., earns some money on his own hook. He is, in fact, a small businessman with many of the same expense classifications involved in his job as Supplee has encountered in the daily workings of the dairy products companies."**

* 1955 figures.

The dairy farmers who supply Supplee with milk have also received pointed details of the company's economics—through the medium of a 4-page insert in *The Sealtest Dairyman*, a house organ distributed four times a year. One of these issues is particularly devoted to explaining company-dairy field economics.

In addition, the milk-area farmers and their families are invited each year to an evening of entertainment and refreshments.

As a part of this program, the entire group is addressed by the company's director of field service who, through use of slides, details the important economics points.

Reviewed also at this time is the economic picture of the farmer—for the country as a whole, for the state, and finally for the local area. No punches are pulled.

Furthermore, this economic report specifically names the amount the company spent in the area during the previous year.

Farmer-family turnout for these annual meetings is always heavy. Invited, too, is the local press, whose representatives usually cover the evening program. Meanwhile, releases covering the economics discussed are mailed to all area newspapers.

Before establishment of the economics program, the story from the milk collecting area was different. Both outright and indirectly, company field men heard it was the farmer-suppliers' belief that the dairies were reaping high profits, while the "duped-farmers" were holding the bag with meager profit.

But expression of this viewpoint began dropping off after the first presentation to suppliers of the company and dairy-field economics. And today all the chip-on-the-shoulder resentment is gone.

Experience with employees, educators, and the public at large has been similar. Many in each category have voluntarily admitted that they earlier had held the conviction that dairies made a profit of between 5 and 11¢ on each quart of milk.

Many also confess their astonishment over the staggering cost of equipment—which, in relation, impresses them all the more when they learn that the company's profit per quart approximates a mere ½¢.

#### Does It Pay Its Costs?

Being an all-inclusive program covering suppliers, employees, and customers, Supplee's economics project is not incurred without expense.

So now come these questions: Does it pay? And if so, how can results be measured?

Supplee finds it does pay, and one excellent gage of the results is the goodwill made evident by the increase in company sales and earnings. To quote a recent yearly report:

**"Our financial scoreboards for Supplee and Clover (Wilmington, Del., branch), the yardstick by which we basically measure our business success, was encouraging. We improved our profit picture.**

**After paying all our bills, including taxes, we had left $1,576,765. This was an increase of about $487,000. Of this amount $1,085,000 was paid to the owners of our business—dividends on the money they invested in it. Reinvested for future improvements or emergencies was $491,000."**

#### Outsiders Opinions

Typical of the attitude of educators toward the company's endeavors is this excerpt from a letter:

**"Usually-vague facts about business, labor, and government are here crystallized into worthwhile information. Such companies as yours have made it possible to see the real results of free enterprise in industry —in the American way."**

And from another letter:

**"A big impression was made on our students—both by the way the plant trip was conducted and by the information thus gained through your efforts. Such real opportunities for first-hand information concerning 'Facts of Life in the Working World' are all too few."**

#### Other Gains

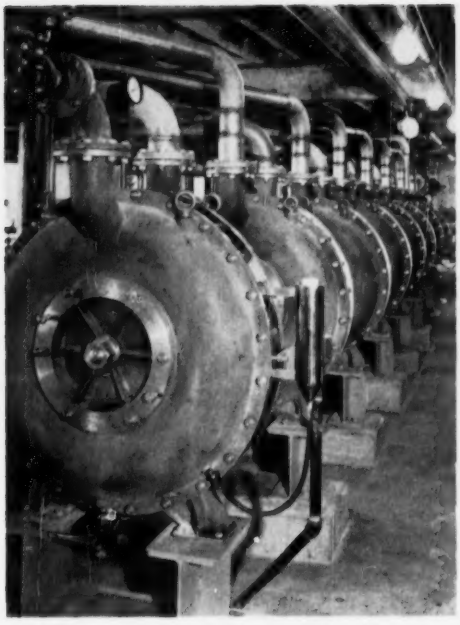
The bearing of Supplee's program on parallel matters is noted:

True, it's hard to determine and gage the influences behind such things as absenteeism and turnover.

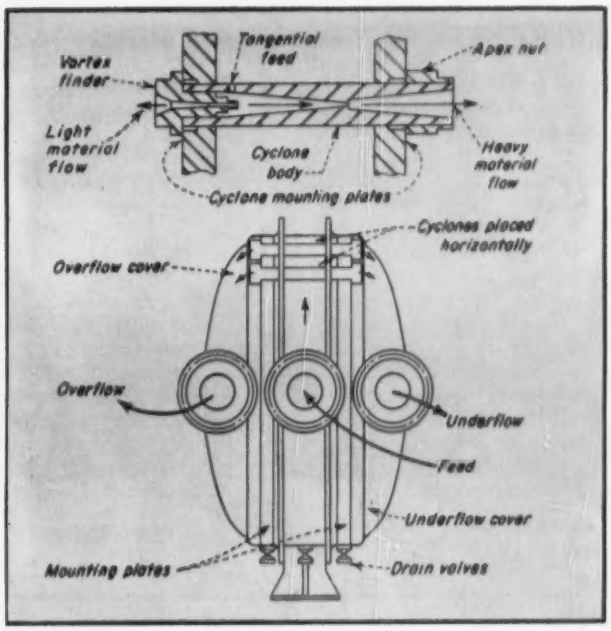
However, it is generally conceded that when employees are content in their job association, and when employee morale is at a high level, absenteeism is held at or near minimum, and turnover is low. Here, the forthright economics program contributes.

There has been no strike at Supplee's since unionization 14 years ago. And only one grievance has gone to arbitration (a case where company action was upheld).

This may be considered to evidence the good influence of the company's long period of high employee morale.



KEY to new process are these eight DorrClone separators, run in series under instrument-control.




SECTIONAL VIEWS show (top) how cyclones separate light from heavy materials, and (above) detailed complete unit.

# Better Separation—Better Starch

**Specially designed cyclonic unit picks off light material from vortex of swirling liquor in new operation to reduce gluten**

**FE STAFF**

*From information obtained at plant from H. C. PIEL and R. A. BINTZ, respectively, Vice-President and Assistant Vice-President-Plant Manager, National Starch Products, Inc., Indianapolis, Ind.*

CHALK UP another achievement in the technical struggle to separate unwanted substances from food materials more efficiently. It comes in an ingenious centrifugal-action application wherein light material is picked-off from the vortex of swirling liquid.

And in this you find a new answer to the problem of efficient, continuous production of cleaner, high quality starch notably low in unwanted protein.

The new advance is employed as a supplementary separating operation at the Indianapolis plant of National Starch Products, Inc. And it involves the use of specially designed DorrClone Separators (Dorr-Oliver, Inc., Stamford, Conn.) Eight of the units operate in series to polish the starch liquor and refine it to very low protein content (about 0.25%).

Starch liquor is supplied to these separators from Merco centrifuges, which efficiently remove 85-90% of the gluten from the mill liquor. And the entire system is engineered to operate automatically and continuously—with full panel-board instrument control to attain more uniform separation.

### How New Unit Operates

Each DorrClone separator comprises a stainless steel housing, within which are 480 horizontally arranged, plastic separating tubes (¾x6 in.). Each tube is lock-nut secured to a pair of vertical stainless plates, spaced within the housing sides to provide collecting reservoirs for separated liquors.

Heavy underflow liquor from the Merco centrifuges is pumped under pressure through the center section of each DorrClone unit. Flow is at 1-to-2 gpm. through a ¼-in. opening in each of the separating tubes.

Heart of each separator is a specially designed, threaded tube, into which liquor flows at a tangent and under pressure. As the liquor swirls, the vortex finder picks up the light material for discharge into the collecting reservoir on the opposite side of one of the stainless plates. Heavy material spins around the sides of the tube, and finds its way down through the neck or venturi (see drawing above).

National's two-stage continuous starch-gluten separating system operates in this manner:

Starch-gluten liquor is pumped from the wet cornmilling operation to Merco centrifuges, operating at a speed of 2,500 rpm. These units separate the mill liquor into light (overflow) and heavy (underflow) fractions. The overflow portion (about 10%) goes to manu-

facture of byproducts (animal and poultry feed), while the underflow is pumped to a conical-shaped surge tank feeding the separators.

Liquor is pumped through the eight DorrClone separators in series (at 65-85 psi) by 30-hp. motor-driven centrifugal pumps, each protected from fiber and grit by basket-type screen strainers.

High quality starch slurry is discharged as the final underflow from the 8th-stage DorrClone. Flow and specific gravity of discharge are controlled by an indicating instrument (Fischer-Porter) as a measure of the efficiency of the separating system. From this point on, the clarified effluent is further treated to produce specialty starches and starch derivatives.

The high protein fraction (overflow) is pumped back to the mill house for further separation. Wash water, introduced from a feed tank on the floor above, flows countercurrent to the starch flow (underflow). The water picks up and dilutes the overflow fraction as it proceeds, one stage at a time, from 8th to 1st DorrClone and then to mill house. Here, too, flows are measured by an indicating-type controller.

Controlled from a panel board, the entire system is fully automatic in operation. Employed are recording-controllers hooked to pneumatically-operated valves for feed (incoming starch-gluten slurry), system overflow (return to mill house), starch-product flow (final underflow from 8th DorrClone unit), and water flow control (countercurrent wash water).

#### Earlier Progress

The Merco centrifugals represented an outstanding advance—a radically new continuous method—when installed following the war. They take up only a fraction of the space that was occupied within two stories of the mill house by the starch tables formerly employed to separate the gluten from the mill liquor. What's more, there is far better and cleaner separation of starch from gluten. And it's carried out within a completely sanitary and enclosed system in minutes, instead of about 8 hrs. as previously.

# Knocks 50% Off Handling Costs

**This saving is scored with long-life crates that enable large-load fork-trucking . . . Cuts manual labor, and safeguards tender produce**

COST OF HANDLING ripe tomatoes from field to cannery has now been cut in half in a Midwestern operation.

**The impressive reduction was won by substituting sturdy James-type wirebound field crates for the hampers formly used, and then employing fork-lift trucks for handling them in pallet loads.**

The changeover has enabled G. S. Suppinger Co. to slash its expenditures for field containers up to 40% through the virtue of the longer life of the wirebound crates.

Packer of Brooks catsup, this firm has canning plants at its Collinsville, Ill., headquarters, and at Shirley, Mt. Summit, Converse, and Lebanon, Ind.

The new slightly tapered handhold-cleated wirebound crates are now used throughout the company's extensive tomato-growing operations serving the latter three plants, where their economy was demonstrated during the '54 and '55 seasons.

#### Minimizes Damage to Produce

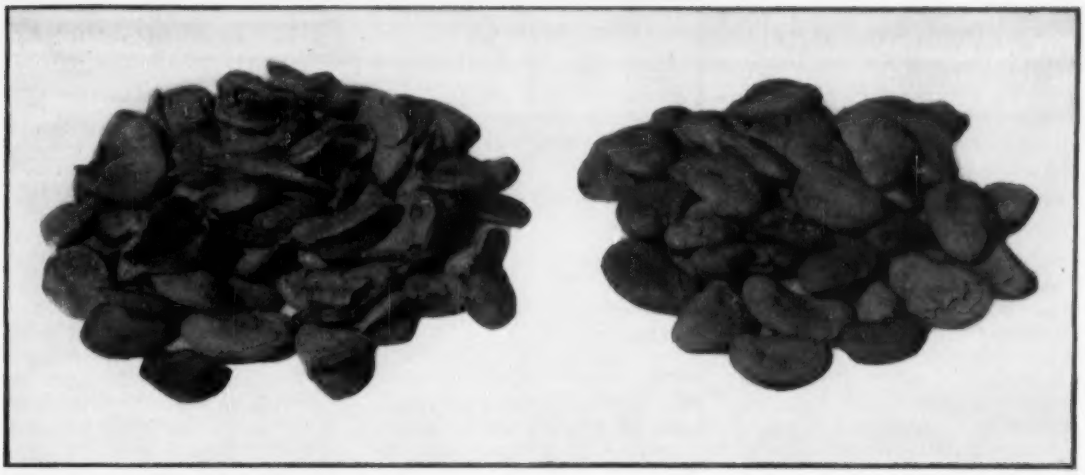
Fewer injuries are sustained by the tender product, says Lyle Clark, v.-p., Indiana operations, because the new system eliminates several handlings.

Pickers put about 35 lb. of tomatoes into each crate. On flat-bed trucks that follow the pickers, filled crates are stacked high on pallets (up to 60 crates per pallet). When fully loaded, trucks are driven directly to the cannery yard, where fork-lifts take over to whisk pallet-loads to the flume feeding into process.

**A-B-C CHANGE SPEEDS MOVEMENT of ripe tomatoes from field to cannery: Packer adopted (A) these efficient field crates that safely stack into (B) big pallet loads for (C) quick fork-lift transfer from trucks to flume.**

**Contrast with the former way highlights the advantages. The old hampers, says Clark, would not stack so high. And at the cannery yard, they had to be unloaded manually, with several more handlings before reaching the flume. This required considerable yard labor—now saved. Also, the shape of the hampers made truck-loads unsteady.**

As for maintenance, the new field crates are dipped in a preservative solution at the start of each season. It's stated that with ordinary care, they should last six or seven seasons, as against only three for the hampers.



**EFFECT OF IRISH MOSS EXTRACTIVE** on precooked dehydrated lima beans. Left: Without additive, seed coats are badly broken. Right: When 0.2% extractive was added to soak water, beans remained whole when dried.

# How Irish Moss Extractive Improves Protein-Content Foods

**Uses of this agent seen multiplying following its striking success in extending mixing tolerances of bread doughs, firming spaghetti, enhancing white cakes, protecting bean hulls, suspending cocoa in chocolate milk, and producing dry icings**

**ELMER F. GLABE, PAULINE F. GOLDMAN and PERRY W. ANDERSON**
Food Technology, Inc., Chicago

IT NOW APPEARS that the familiar forming of water suspensions by Irish moss extractive (carrageenin) is just a door-opener to a number of very interesting new uses for this agent.

Research has now demonstrated that it also forms complexes with proteins, and we may cite several strides that have initiated the new possibilities:

**Namely, there have been remarkable improvements in beans, dough, spaghetti, and white cake—as well as those with chocolate drinks and icings—with the credit going to protein complexes set up in these products by as little as 0.03% of Irish moss extractive.**

Additional research may finally determine that the beneficial effect in flour-containing foods is partly due to the reaction of the extractive with the carbohydrate system of the flour.

Since Irish moss extractive is itself a polysaccharide, it may well influence the pentosans and water-soluble polysaccharides of flour.[1, 2] It is here that bright new prospects are seen.

The effect of anionic detergents (but not cationic and nonionic detergents) on wheat-flour proteins is

## Thumbnail Brief on Extractive

The versatile Irish moss extractive, or carrageenin, is specifically the hydrocolloid material obtained from the red marine plant, *Chondrus chrispus*.

This plant is gathered from the Atlantic Ocean and dried. Then (1) the material is extracted with fresh water, (2) dehydrated on roller-type dryers, and (3) ground into a powder.

Resulting Irish moss extractive is readily suspendable in water. The sols thus produced vary in both physical and chemical properties, depending on the specific treatment during extraction and drying. Many variations in properties are possible.

In the food industry, it has been a long-standing practice to employ hydrocolloids (including, as well as Irish moss extractive, agar, gelatin, locust bean gums, and guar) for improving the gel-forming properties of foods. The hydrocolloids enable formation of the gels at low temperatures. Thus, heavy particles are kept suspended in fluid or semi-liquid foods.

measurable on physical testing equipment.[3] Later research showed that Irish moss extractive, also an anionic compound, reacted with wheat flour. With the experimental work carried further, such reactivity was revealed by the following testing procedures:

#### Points on Gluten Washing Tests

When gluten was washed from a standard baker's flour, and from a flour pre-blended with 0.2% Irish moss extractive, and the gluten was rolled into balls, the ball with the extractive appeared larger annd more firm than the control. Then, when each of the two gluten balls was covered for 5 sec. with a 2-lb. weight the one with extractive showed more tendency to return to a round shape (within 15 sec. after removing the weights).

In Fig. 1 we see the effects that different quantities of one type of extractive have on the gluten strength of a Southwest winter wheat baker's flour. A numerical scale was assigned for the gluten-strength value, describing the variations in feel of the wet gluten balls.

On this scale, a value of 1 represents an exceedingly loose and flaccid mass. Note that 0.1% it the lowest level of extractive that effects flour gluten. This effect increases up to 0.3%, after which gluten disintegration has progressed too far for satisfactory testing.

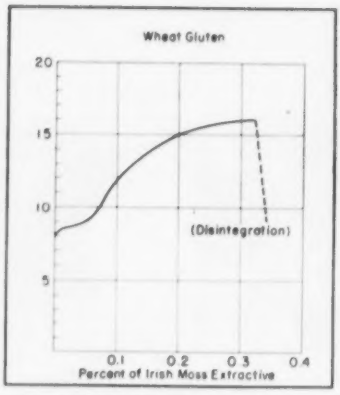



**FIG. 1. WHEAT GLUTEN** (Kansas winter wheat baker's flour) doubles in relative strength (ordinate) under the influence of up to 0.3% added Irish moss extractive. Use of more extractive results in disintegration of the gluten.

It was noted that added extractive did not change the pH of the gluten.

Other physical testing apparatus also gave evidence of this protein reactivity of the extractive with gluten. Farinograph curves of high protein flour treated with 0.25% extractive show a more rapid dough development than untreated controls.

Dough containing the extractive also remains at its maximum for a longer period of time. This fact is useful because mixing tolerance of the flour is thus increased. Also, it again demonstrates reactivity of the protein with added extractive.

Carrageenin affects Kansas winter wheat flours less than the high protein flour noted above. And Texas winter wheat flours thus far examined, along with soft wheat flours, show the least reaction, as measured by the Farinograph. However, the reaction with the latter flours is observable and is important enough to be commercially usable.

Cracker sponges show reactions with the extractive in the Mixogram apparatus. Fig. 2 shows Mixogram patterns for 0.10 and 0.25% carrageenin dry-mixed with the flour and 0.25% suspended in water before mixing. Latter method gives the most pronounced effect.

Commercial bread-baking experiments show that the Farinograph tests are translatable into longer mixing tolerances for the doughs, and in more uniform exterior loaf characteristics—mainly oven spring. These results were shown on flour doughs that failed to respond to the known

## Charts trace cracker sponge fermentations

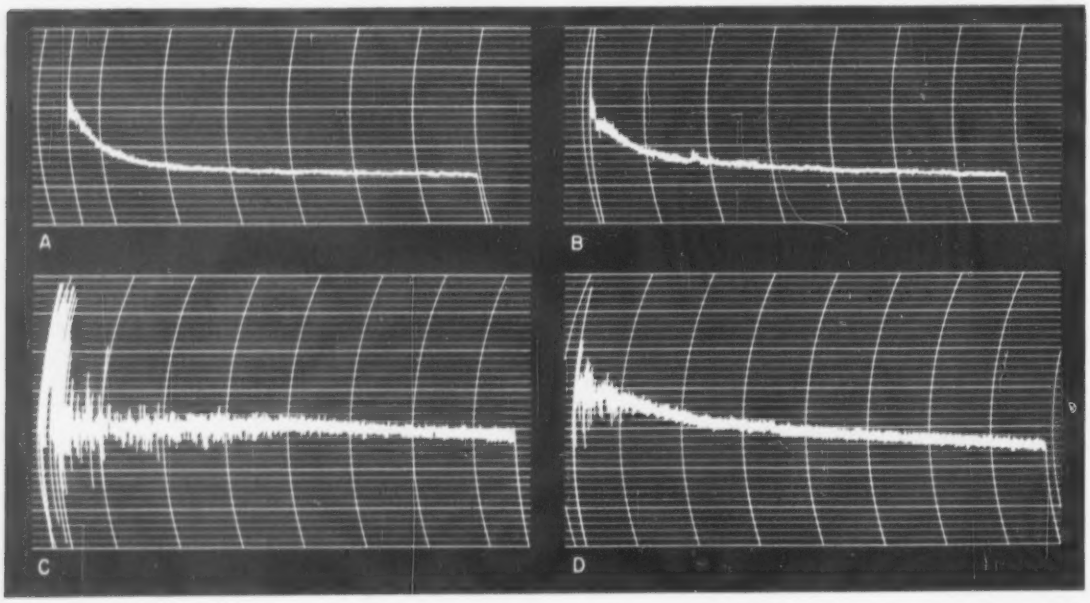



**FIG. 2. MIXOGRAM CHARTS** show effect of extractive on cracker sponge during 16-hr. fermentations: (A) Control (no additive); (B) 0.1% extractive added dry, (C) 0.25% suspended in water, and (D) 0.25% added dry.

oxidizing agents, potassium bromate and potassium iodate.

### Case of Alimentary Pastes

Spaghetti made from durum semolina and hard wheat farina responds to carrageenin by displaying decreased sensitivity to cooking.

Commercial tests were made with spaghetti dough containing 0.2 to 0.3% carrageenin. The dried spaghetti was cooked 20-min. in boiling water. Then a four-member taste panel examined the spaghetti relative to softness and resiliency (measured by mouth feel).

Spaghetti containing the extractive was consistently rated firmer and more resilient during chewing.

Cooked spaghetti was also tested on a Brookfield stress-strain unit. This instrument applies a constantly increasing force of 1 to 1,000g. until the spaghetti strands are broken. Results are registered on graph paper.

This instrument also measures elasticity. However, this is not a significant feature of cooked spaghetti strands, according to our tests.

A comparison of Brookfield breaking-strength values and taste-panel observations is shown in the following table.

**Effect of Irish Moss Extractive On Spaghetti Cooking Value**

| Percent SK14 Irish Moss Extract | Brookfield Breaking Strength | Panel Firmness Score |
|---|---|---|
| 0 (Control) | 412 | 6 |
| 0.075 | 447 | 7 |
| 0.10 | 475 | 7 |
| 0.20 | 522 | 9 |
| 0.30 | 557 | 10 |

It will be seen that agreement is, in general, close.

### Reaction With Other Proteins

Egg and certain soy bean proteins show definite reactions with Irish moss extractives. Mix a suspension of carrageenin with a solution of soya protein, or dry or fresh egg albumen, and a precipitate is formed.

An example of the practical use of this reaction is found in making quick-drying icings for use on sweet rolls. Here, a soya protein and Irish moss extractive reaction affects size of sugar crystal and film formation —requisites for quick wrapping in commercial practice.

Other vegetable proteins also show reactivity. For instance, in the preparation of precooked dehydrated legumes, a difficulty encountered is retention, intact, of the inner seed coat during drying.

Steps in the process involve soaking dried lima or navy beans in water, followed by draining, pressure cooking, and dehydrating. Beans are then quickly rehydrated by adding the required amount of water and cooking for a brief period.

Breaking the hull, or seed coat, of lima beans results in a product which, upon rehydration, resembles a mash instead of whole beans. However, if the extractive is added to the soaking water during processing, behavior of the seed coat during dehydration is different (initial illustration).

There is then reduced damage to the seed coat of the dehydrated bean in processing, and it appears more like a whole bean.

This suggests that there might be advantages relative to the reaction of the extractive with other vegetable proteins that are subjected to severe heat during canning, dehydration, or freezing.

### Effect on White Cakes

Another practical application of the Irish moss-protein reaction is its effect on white cakes. As previously pointed out, the carrageenin reacts with egg albumen.

In a series of white-cakes containing 1.5% egg albumen, addition of the extractive (dry) produced notable effects on the cake characteristics. For instance, texture was improved—this feature being particularly noticeable after storing the cake and comparing it to a control.

Other properties proved as good as those of the control. Hypothetically, reaction of egg with flour proteins could be responsible.

The foregoing data indicate that the protein is undoubtedly reacting with the extractive in flour-containing food products. But it is reasonable to suspect that the starch or general carbohydrate system of flour is a factor in the effects of carrageenin in bread and cake.

### Reactions With Milk

Irish moss extractive's performance when in contact with proteins is largely credited to its formation of complexes with proteins. An example is chocolate drink, where the extractive reacts with milk protein to keep cocoa particles suspended uniformly throughout the liquid (see our Fig. 3).

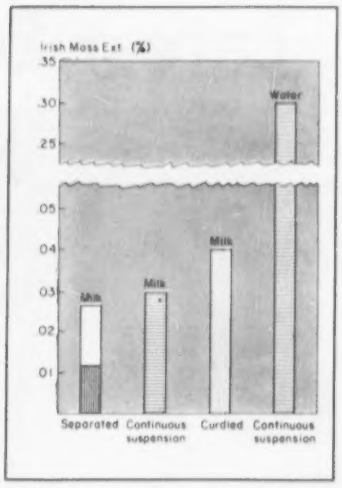



**FIG. 3. EXTRACTIVE-PROTEIN REACTION is demonstrated by the amount of Irish moss extractive required to suspend 1 lb. of cocoa in milk, and in water.**

Amount of extractive to suspend 1 lb. of cocoa in 100 lb. of milk is between 0.03 and 0.04% (based on the milk).

The resulting protein complex is responsible for suspension of cocoa particles, as indicated by these two observations:

1. If less than 0.03% of extractive is used, "fall-out" of cocoa particles takes place immediately after agitation of milk is stopped. If as much as 0.04% of carrageenin is used, curd formation begins and "wheying-off" or separation occurs.

2. To suspend the same amount of cocoa powder in 100 lb. of water, ten times as much extractive (0.30%) is needed. This demonstrates that matrix formation is not the sole factor in causing the cocoa suspension in milk.

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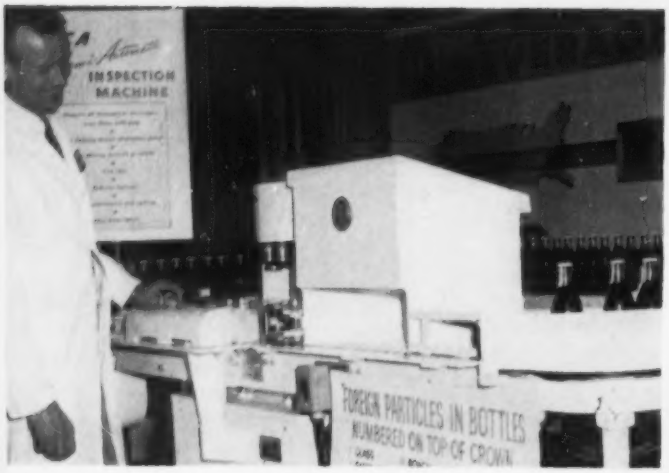
*Relative to this study, the authors wish to acknowledge the early work of Dr. Betty Sullivan with anionic compounds.*

# Latest Equipment for Bottlers

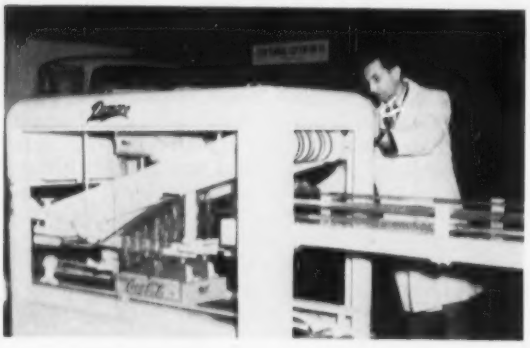
Newest inspection and handling devices attract eyes at ABCB show in Cleveland. Also highlighted are special washers, and fillers, valves and sprayers, trucks and bodies.




**THIS SEMI-AUTOMATIC UNIT** is for smaller plants, and for checking of pulp drinks. It swirls liquid in bottles while operator views it at 90-deg. to path of light.—Radio Corp. of America, Camden, N. J. (68A)

## Inspecting, Uncasing, Packaging Units

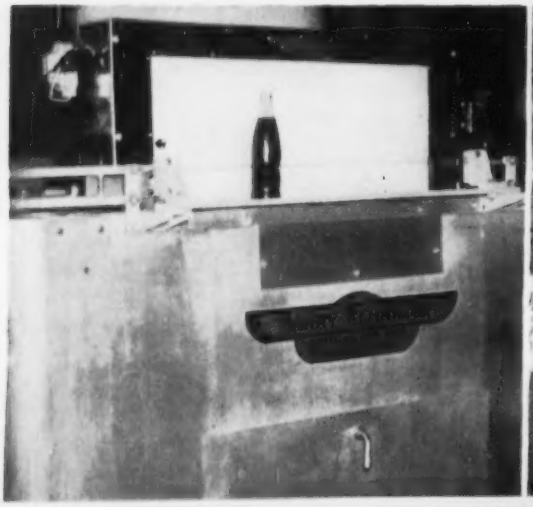
**EMPTY BOTTLE INSPECTOR** mounts on discharge conveyor, operates at up to 220 bpm. Handles all types, including colored and color-applied.—Brookdale Laboratories, Bloomfield, N. J. (68B)



**HALF-DEPTH UNCASER** employs V-belts to lift bottles vertically and set them on conveyor at 400 bpm. speed. Case guides and hold-down mechanism insure bottle release. —Geo. J. Meyer Mfg. Co., Cudahy, Wis. (68C)

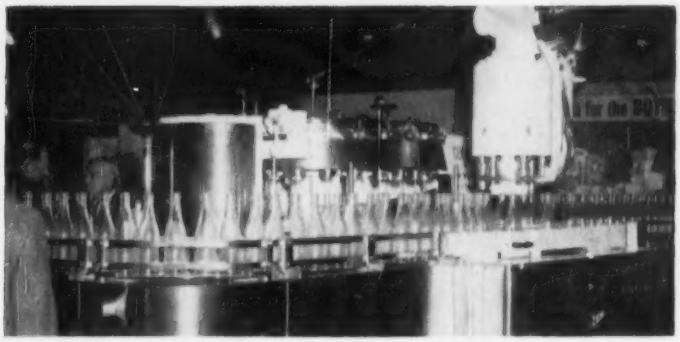
**FOR VISUAL INSPECTION,** this unit uses pink light from tubes set behind Plexiglas diffusion screen. Bottles move along drag strip that slowly rotates them.—Barry-Wehmiller Mach'y. Co., St. Louis. (68D)

**2-QT. CARTONING MACHINE** operates at 40 bpm. or intermittently. Takes flat cartons from magazine, sets them up, and loads them with two 1-qt bottles: Maker: R. A. Jones, Inc., Cincinnati. (68E)

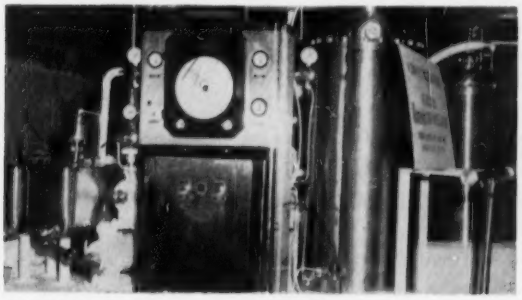


## Fillers for Bottles and Tanks

**SPEEDY FILLING** of any size pre-mix tanks (5 per min.) is possible with this unit equipped with accurate syrup-meter. Cherry-Burrell Corp., Chicago. (69A)



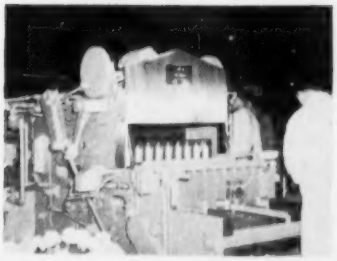
**60-VALVE ROTARY FILLER** features 3-ft. twin infeed screw that marshals two bottle conveyors into a single line to attain speed of 400 (12-oz.) bpm. without injuring bottles. Unit also fills quarts at 240 per min.–Geo. J. Meyer Mfg. Co., Cudahy, Wis. **(69B)**



**PACKAGED** mixing-carbonating unit comprises highly accurate Flo-Mix metering device, standard Carbo-Cooler, and filler for 5- or 10-gal. pre-mix tanks. Capacities from 270 to 1,600 gph.–Mojonnier Bros. Co., Chicago. (69C)

**VERSATILE 28-VALVE FILLER** has 6-head crowner with syruper for variety of flavors. Can also be used with CEM Uni-Blend system by by-passing syruper.–Crown Cork & Seal Co., Baltimore. (69D)

## Bottle and Tank Washers



**SINGLE-END WASHER** (6-16 wide) employs tubular heat exchanger for hot caustic and rinse sections to minimize bottle breakage–Archie Ladewig Co., Waukesha, Wis. (69E)

**NEW 10-POCKET WASHER** handles 150 bpm. It has pre-rinse, pre-wash, primary soak, and final rinse sections.–Miller Hydro Co., Bainbridge, Ga. (69F)

**PRE-MIX TANK WASHER** pre-rinses, washes, and rinses a tank every 2-min. Removable nozzles direct water on both inside and outside.–Cherry-Burrell Corp., Chicago. (69G)

***For detailed data on units circle key number on Reader Service Card in back of book***

## Trucks and Bodies

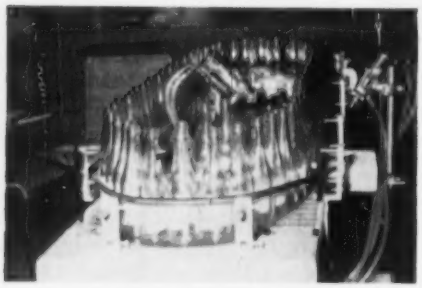
**HAND TRUCK** of magnesium is designed to handle four 5-gal. pre-mix cylinders at one time. Easily removable frame enables use for other purposes.—Moellenbrock & Wilke, Inc., Washington, Mo. (70A)

**FOR SPEEDY HANDLING** (either pallet or deck) of cased beverages, this truck body has light plastic rollup doors.—Timmons Metal Prod. Co., Columbus, Ohio. (70B)

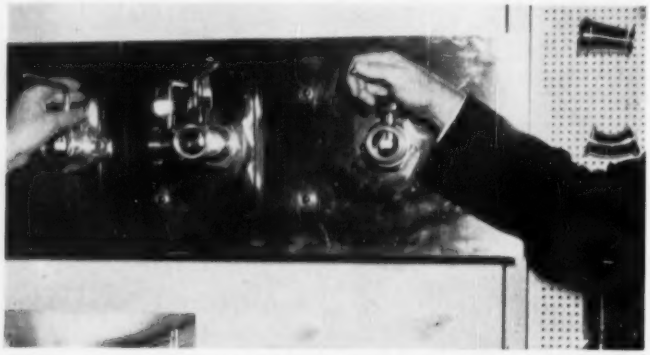
**NEW TRUCK** features wide, alligator-type hood with sturdy 2-position stop—full 90 deg. for servicing, half-way for routine checks.—Dodge Div., Chrysler Corp., Detroit. (70C)

**TRUCK BODY** of Fiberglas has roll-up doors to permit easy loading, removable hinged-deck for pallets.—Kinnaird Body Works, Inc., Bromley, Ky. (70D)

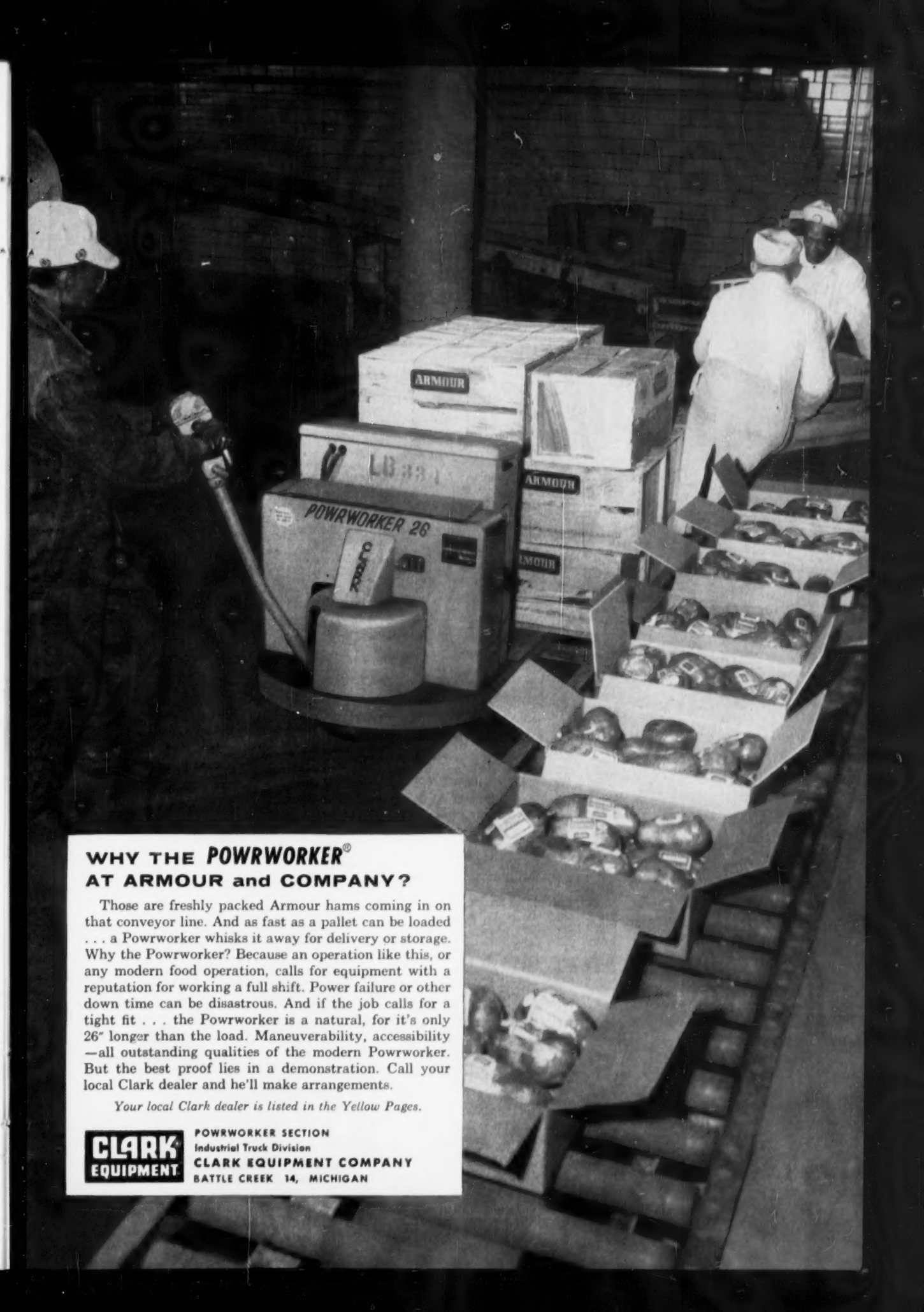
## Miscellaneous Units



**SPRAY UNIT** applies silicone solution to bottles to protect surfaces.—Brockway Glass Co., Brockway, Pa. (70E)



**NEW BUTTERFLY VALVE** is easily removed for cleaning by loosening screw-type nut. Neopene ring eliminates metal-to-metal contact in valve seat.—Tri-Clover Div., Ladish Co., Kenosha, Wis. (70F)




## WHY THE *POWRWORKER*® AT ARMOUR and COMPANY?

Those are freshly packed Armour hams coming in on that conveyor line. And as fast as a pallet can be loaded . . . a Powrworker whisks it away for delivery or storage. Why the Powrworker? Because an operation like this, or any modern food operation, calls for equipment with a reputation for working a full shift. Power failure or other down time can be disastrous. And if the job calls for a tight fit . . . the Powrworker is a natural, for it's only 26" longer than the load. Maneuverability, accessibility —all outstanding qualities of the modern Powrworker. But the best proof lies in a demonstration. Call your local Clark dealer and he'll make arrangements.

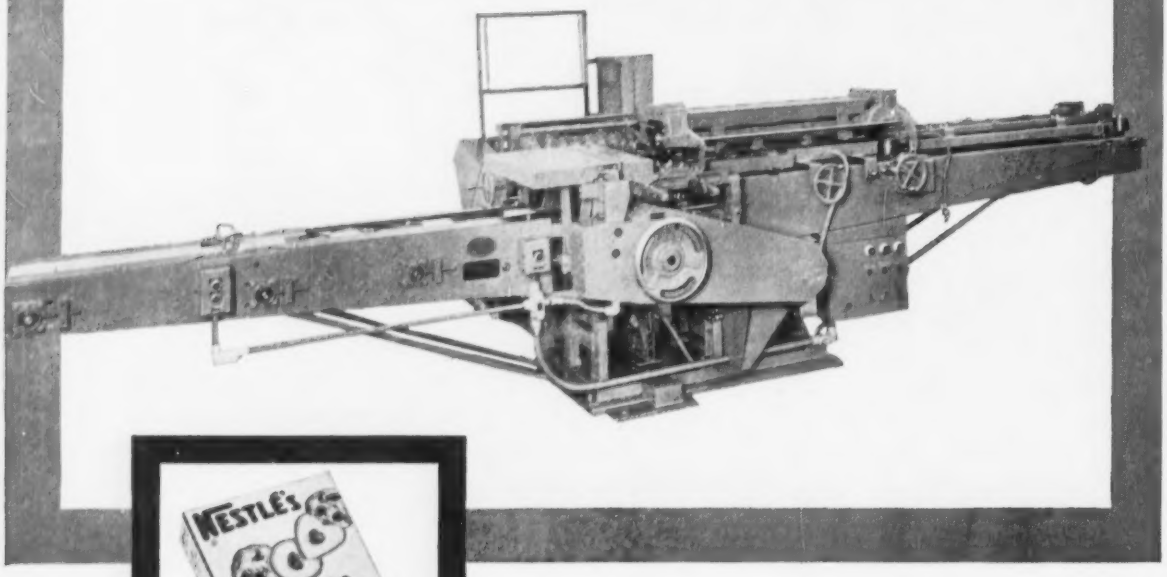
*Your local Clark dealer is listed in the Yellow Pages.*

CLARK EQUIPMENT

POWRWORKER SECTION
Industrial Truck Division
CLARK EQUIPMENT COMPANY
BATTLE CREEK 14, MICHIGAN

## Model FF-H Wrapper Gives Nestlé

# HIGH SPEEDS, ACCURATE REGISTRATION



To wrap its cookie mix package, Nestlé uses a Model FF-H wrapper. This is just one example of how the versatile FF-H, originally designed as a high-speed frozen food wrapper, is now serving in a number of other fields. Electric eye mechanism and slip-proof paper feed provide accurate registration of the heat-sealing foil wrapper. Nestlé can wrap up to 150 packages a minute with maximum efficiency.

An integral, automatic feeder moves cartons through the FF-H for straight-line, horizontal wrapping. Paper feed stops automatically when no package is fed. Loads are evenly distributed throughout the wrapping cycle to keep moving parts and bearings shock free.

You will find the Model FF-H has been engineered to give you ease of operation plus low maintenance. It is a one-operator machine. A counterbalanced "lift-up" transport assembly facilitates cleaning and operating. To get complete details on how you might use the FF-H, contact your nearest Package representative.

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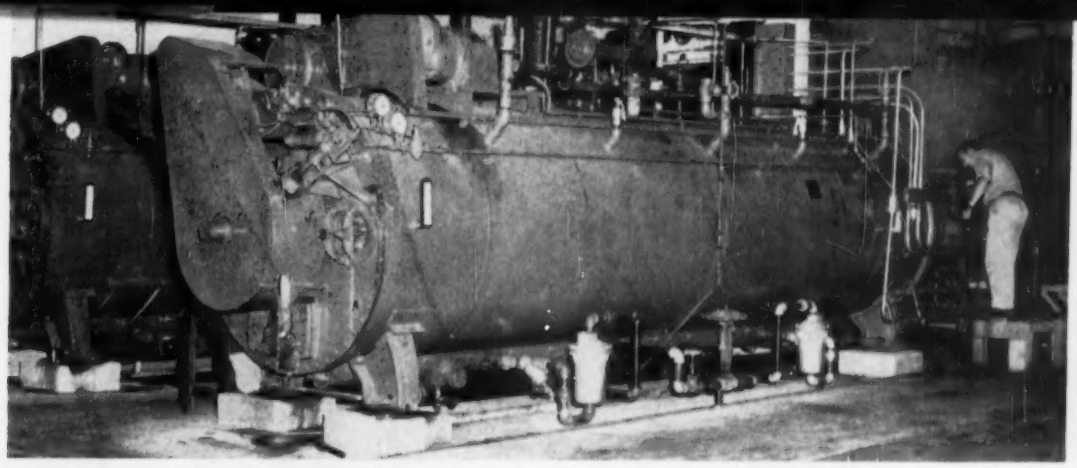
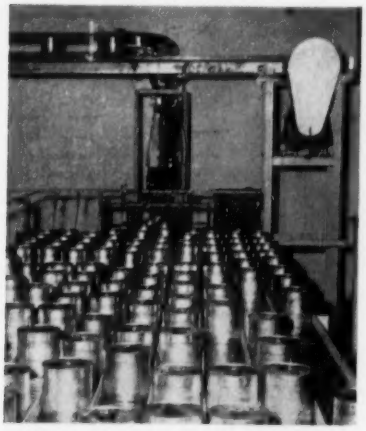
**PACKAGE MACHINERY COMPANY**

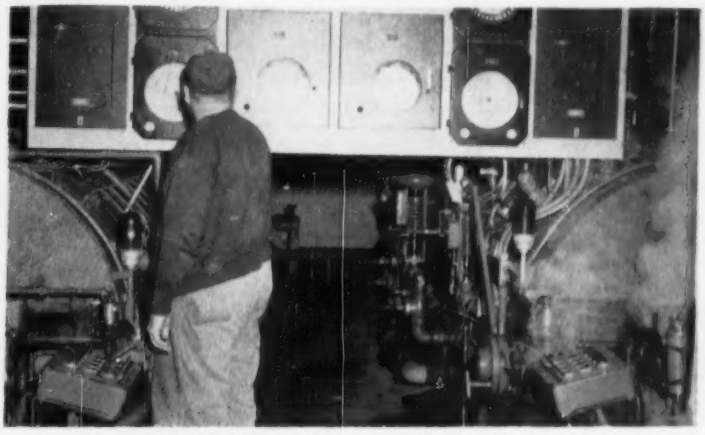


← For more data, circle this page number on card at back



**THESE SEMI-AUTOMATIC RETORTS** are now in action at Green Giant on their initial production of corn in institutional-size cans (75 oz.). The two units—called Agi-Torts—turn out top-quality vac-packed product at 36 cans/min. While one is processing, other is unloaded and reloaded.





**FEED AND CONTROL:** Company-designed accumulating table (left) holds 400 cans for alternate feeding of two retorts. Right: Pushbuttons control automatic in and out movement of cans, and processing is instrument-regulated.

# Upping Output Wins Extra Benefits

**Engineered astutely, a production-boosting program can bring prime additional advantages all along the line—as Green Giant notably demonstrates**

**HARVEY A. SCHEEL**

Director of Engineering, Green Giant Co., Le Sueur, Minn.

**TREMENDOUS PLUS-VALUES** can be achieved by smart engineers when they increase the capacity of a food processing operation. They can, in addition, up efficiency with new and advanced methods, and come out with better quality control as a byproduct.

**This is precisely what happened when Green Giant modernized its Fox Lake, Wis., cannery to provide more capacity for its corn pack.**

**Besides getting higher throughput, the engineers simplified materials handling, reduced maintenance, bettered sanitation, made working conditions easier, and improved quality control. They even worked out ways to save on construction costs.**

There were five key phases in the program:

**(1) Installation of two semi-automatic end-over-end retorts with 36 cans/min. capacity.**

**(2) Automating of the processing cycles with master controllers.**

**(3) Building of easy-cleaning features into equipment.**

**(4) Putting in a continuous waste-removal system.**

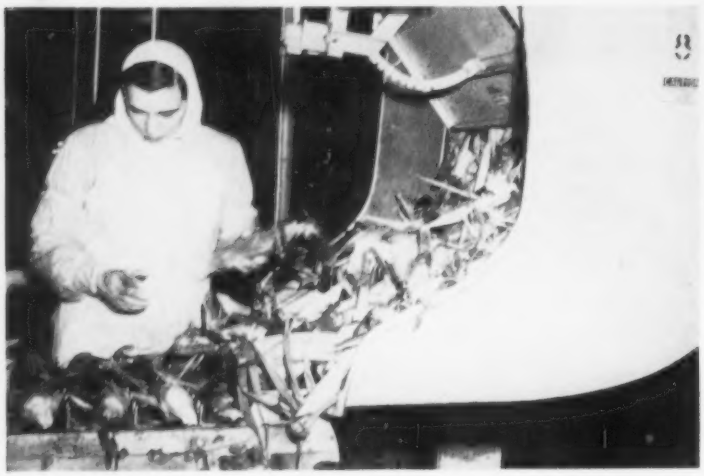
**(5) Field-checking of corn freshness to speed flow at receiving dock.**

Hottest processing improvement was installation of two FMC Agi-Torts, employing end-over-end agitation (FE Feb. '53, p. 70). These provide high-temperature short-time thermal processing of vacuum-filled, 75-oz. (603x600) institutional-size cans.

Processing time is staggered so that one unit is operating (cooking and cooling) while the other is being unloaded and re-loaded.

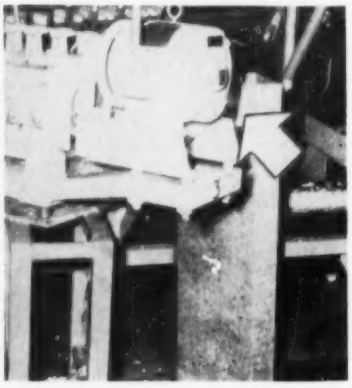
On their way to the retorts, cans

## 4 Effective, Yet Simple, Process Innovations

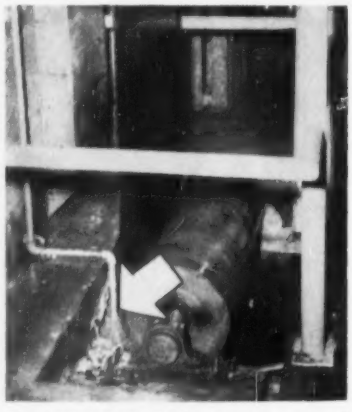


**6-IN. FLARE** on lip of chute that supplies the corn facilitates feeding of cars onto conveyor going to husking stations.

**MAINTENANCE IS REDUCED** by conveyors that have Nylon bearings. They use no oil that might contaminate product.



**COBS DISCHARGE** from cutters directly into chute (arrow). This takes them right to gutter without need of a conveyor.



**SILAGE CONVEYOR** is water-sprayed (arrow) when making return trip to processing. This serves to lubricate the belt.

are fed single-file past overhead sprays to a Green Giant-designed accumulating table where a starwheel-type divider alternately feeds them into two rows onto flat-top chain conveyors. Each row travels back and forth four times on the 400-can table.

An air-operated switch (80 psi.) alternates flow of cans from accumulating table to either retort. Cans continue through twisters that turn them body-side down for starwheel-delivery to loading ladders (10 in. x 18 ft.) running in and out of flights of the can reels.

Each of the 16 ladders contains 29 pockets. Ladders are pushbutton indexed into the rotary shaft for loading and unloading of retorts. During loading and unloading, ladders activate a Microswitch that automatically stops a belt-driven conveyor.

A second limit switch then actuates an air valve, operating under 60-70 psi., for automatic loading and unloading of ladders to retorts.

### Automatic Master Controller

The retorts are hooked to timed-sequence controllers (Taylor Flex-O-Timers), and temperature and pressure recorder-controllers. This instrumentation system automatically controls retort-processing cycle—venting, cooking, cooling, and blowing down.

Controller-time dials have removable program trip pins for "on" and "off" operations. Pins are clamped on dial to exact time at which retort operations are to be carried out.

Timed-sequence controllers operate temperature and pressure controller according to pre-set times and in proper order. Operations are through air valves and switches, with latter actuated by pins on step disk.

### Easy Cleaning Stressed

Sanitary, highly efficient continuous flow—from receiving apron to processing, canning, and finished goods storaging—is provided through a well-engineered plant layout. Each processing unit can be shut down for cleaning during production breaks. Once every 4 hr, corn huskers and cutters are hosed down with water containing 10-12 ppm. of chlorine.

Six strategically spotted hoses supplying chlorine solution serve 17 corn huskers, roller-type inspection conveyors, and cutters. Below each unit, waste water collects in 6x6-in. non-clogging type concrete gutters that flume it out of plant. Water is chlorinated by a unit (Wallace & Tiernan) at the well, and fed into the plant at a 1,000 gpm rate.

Another feature that justifies attention is the extra 6-in. flare at bottom of the 37-deg.-inclined chutes feeding corn to huskers. This simple change in chute design minimizes binding and makes it easier for girls to feed corn to huskers.

Two major processing advances stemmed from the installation of

special roller-type inspection conveyors (Green Giant-designed, built by Link Belt), which carry corn from huskers to cutters. First off, construction of the rollers is distinguished by the use of non-corrosive aluminum tubing and pre-cast Nylon bearings. These long-wearing bearings are water-lubricated, thereby they eliminate the possibility of any product being contaminated by oil.

Second advantage here lies in the new arrangement of these conveyors at right-angles to the huskers. This way, some ears discharged from huskers automatically fall into valleys of the conveyors without need of manual orientation. As a result, only one girl (instead of two) needs to be stationed at the husker-conveyor transfer point.

#### Continuous Waste Removal

Cobs are ejected from the newly designed corn cutters (3A's, FMC) and chuted into gutters that flume them to a separator pit outside of the cannery. About 500 gpm. of plant waste water flumes the cobs.

A noteworthy plant-modernization economy has been attained, states Plant Manager Robert Engler, through use of a specially designed conveyor carrying kernels from corn cutters to cleaning equipment (de-cobber and de-silker). Here, the drive is installed on the tail-end or slack side of conveyor and thus pushes instead of pulls the belt. As a result, 4 ft. of additional height is gained in only 25% of original length of inclined section of belt.

This simple modification has enabled the company to employ a shallower 5-ft. deep (instead of 9 ft.) pit housing for the corn-cleaning equipment. What's more, this 4-ft. saving in depth is also realized in the waste-separator and waste-water pits.

The de-cobber unit is equipped with a series of rotary, circular metal blades, spaced ¾ in. apart and in vertical position. Pieces of cob and husk are discharged into a flume that flushes them into the separator pit.

Then, at the de-silker unit, chain-driven rakes remove the corn silk, which is also flumed to the waste pit. Kernels continue in a flume to a 10-hp. pump (Fairbanks Morse-Chisholm Ryder) pump. This delivers them to a bank of gravity separators for further cleaning.

Waste water is flumed from production areas in slightly pitched gutters that flow into one another and then into the 5x20x30-ft. separating pit outside of the cannery.

Water entering the pit flows through a vibrating separating screen (Link Belt) that removes and transfers waste solids onto a flight conveyor along with such other silage as husks, cobs, silk, and rejected corn. Except for the cobs, all are belt-conveyed out of the processing plant and into the separator pit.

This is a 36-in.-wide belt that has no flights or frames where waste may accumulate. This eases cleaning.

The belt slides smoothly over a concrete trough instead of rollers, and it is lubricated by water flowing between belt and trough.

Flight elevator (15 ft.) lifts silage from separator pit into manure-spreader type units that distribute it for curing into animal feed.

Waste liquid flows into another pit (20x30 ft.), from which it is pumped through portable 6-in.-dia. aluminum pipes to a farm 1½ miles away, where it is disposed.

#### Checking Field Quality

Green Giant has initiated an intensive field-sampling program to insure canning of farm-fresh corn and to expedite production.

Maturity of corn is now precisely determined upon selection of samples from each 10-20 acres. Only when moisture tests indicate maturity is the corn harvested and hauled in.

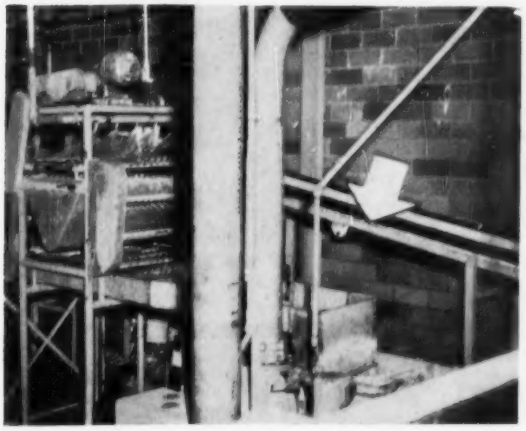
Formerly, corn was trucked to a combination moisture-lab and scale-house outside of the plant. Here, time was lost as trucks queued up awaiting test of samples.

The new pre-testing system abolishes the old truck line-ups at the receiving apron, since the vehicles unload directly and return to the fields for further loads.

Thus, there's no more reception of immature corn, which when formerly received had to be held over. And delays are avoided.

For further efficiency, the moisture-testing building has been taken from the apron and re-located at a point near the waste-separator pit. Here, it receives the field samples that are to be checked, and the silage accumulating from these tests is directly disposed along with the silage coming from the cannery lines.

## Save on Pit Construction

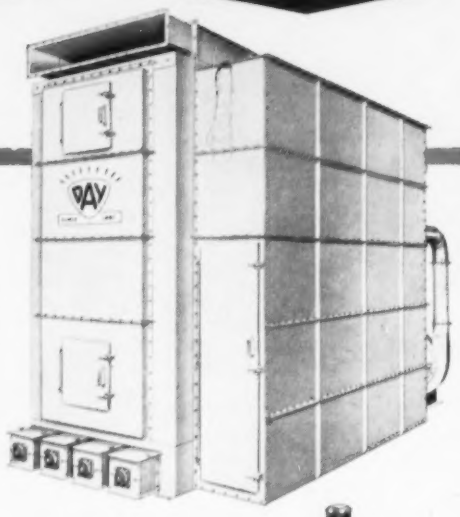


**SPECIAL CONVEYOR BELT** (arrow) operates by push drive (instead of pull). This lifts it higher, enabling use of shallower pit for corn-cleaning units.

**SAME HIGHER BELT** brought Green Giant similar savings in construction of a more shallow pit (above) for separating silage and other cannery wastes.

**DUST CONTROL** | **BULK STORAGE** | **PNEUMATIC CONVEYING**

# DAY PRODUCTS
## SERVE THE FOOD INDUSTRY



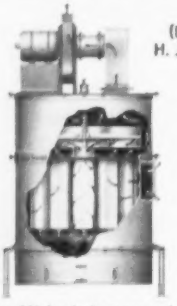
### . . . CONTROLLING DUST

**DAY "AC" Reverse-Jet DUST FILTER** ● Dollar for dollar, feature for feature, you get more for your money with a DAY "AC" filter. Economical first cost and low maintenance PLUS the fact sub-assembly by DAY saves up to 75% on installation costs. ● Felted filtering media captures sub-micron dust particles with 99.99+% efficiency. Media porosity is maintained by self-adjusting, high pressure, reverse-jet blow rings. ● DAY filters occupy less floor space—need less headroom—are furnished to operate on suction or pressure. ● May be installed inside or outside; outside units completely weatherproof. **Write for Bulletin 559 for complete facts and engineering data.**

(Licensed by H. J. Hersey, Jr.)

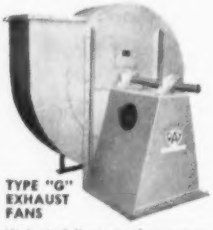
**DUAL-CLONE DUST SEPARATOR**

Exclusive DAY design provides high efficiency with low horsepower requirements. **Write for Bulletin 49DC.**



**TYPE "RJ" DUST FILTER**

Surge of high velocity reverse air maintains filter media porosity of this "packaged" dust filter. 99.99+% efficiency. **Write for Bulletin 560.**



**TYPE "G" EXHAUST FANS**

High air delivery per horsepower required. Statically and dynamically balanced; designed exclusively for dust control applications. **Write for Bulletin 471.**

**DAY UNIT DUST CONTROLLERS**

Complete, low cost unit combines high efficiency of DAY Dual-Clone and Exhauster. Ideal for remote locations. **Write for Bulletin 510.**

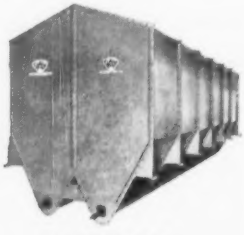
**A SINGLE UNIT OR A COMPLETE DUST CONTROL SYSTEM**

DAY Vertical Type Bulk Storage Bins

### . . . HANDLING AND STORING BULK MATERIALS

**Vertical or horizontal bins,** special sizes or groups furnished to meet production needs; air lock rotary valves, twin screw feeders and other auxiliary equipment optional. DAY bins need no field riveting, soldering or welding. Built and shipped in easily erected bolted sections. **Write for Bulletins 529 and 549.**

**AIR LOCK ROTARY VALVE**



**HORIZONTAL TYPE BULK MATERIAL BIN**

**INDIVIDUAL BULK EQUIPMENT UNITS OR A COMPLETE BULK MATERIAL SYSTEM**

### . . . PNEUMATIC CONVEYING

**DAY Pneumatic Conveyor equipment and systems** provide a modern method of bulk material handling. Self-cleaning to prevent contamination or product deposits in system. Speed of operation improves plant efficiency. Write for details.

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*The* **DAY** *Company*

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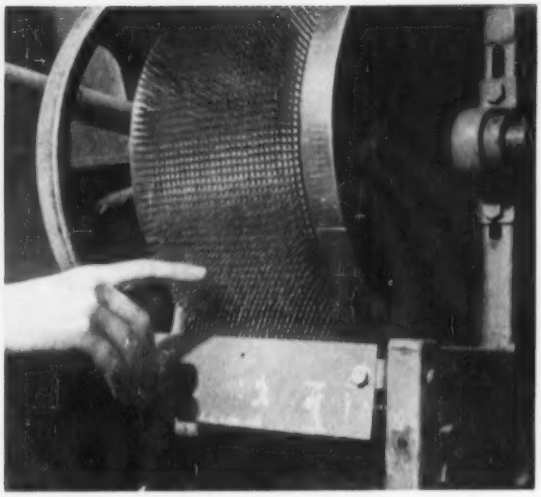
Representatives in Principal Cities

**CRANBERRIES** first get thorough cleaning and inspection to assure they are "choice" for processing into new "Cransweets," then . . .



. . . **THIS MACHINE** pierces all the berries, preparatory to their impregnation with sugar and corn syrup. Stainless spikes number in the thousands.

# *From:* New Processing Idea *To:* New Multi-Use Product

**Fact that the cranberry ruptures under heat processing formerly made that fruit a "secondary." But no longer. Today, a special machine punctures it, then vac-syruping changes it into a new-flavor item**

**VERNON GOLDSWORTHY**

President, Cranberry Products, Inc., Eagle River, Wis. (Photos courtesy A. E. Staley Mfg. Co.)

BY THINKING OUT a *new* way to process an *old* product, you can create what amounts to a brand new food, with new uses.

A case in point is the recent development of a new technique for processing the cranberry—whole. This has expanded use of this fruit in the food industry.

The specially processed cranberry is known as a Cransweet—a whole, plump, ruby-red berry that is sweeter, yet retains the characteristic cranberry flavor.

### Brief of Innovation, Applications

Heretofore, cranberries ruptured when they were heat-processed, and for this reason they could only be made into sauce, jelly, or relish. However, in the Cransweet method* each of the naturally tart berries is pierced so that it can be sweetened under vacuum with sugar syrup—and without rupturing the fruit.

**▶ The principle is also seen promising with certain other products. For instance, this technique might be employed to pierce cucumbers and so enable a new type of processing in pickle manufacture.**

With their different, pleasant flavor, the specially processed cranberries are heralded as a new food ingredient.

**Available in either whole or half-berry form, they are now being used in the manufacture of chocolate-coated cordials, candy bars, ice cream, sherbet, bakery goods, frozen dinners, etc.**

**The berries are also spice-pickled whole as an appetizing relish for the retail and institutional trades.**

*Process was developed by K. G. Weckel, professor of dairy and food industries, U. of Wisconsin College of Agriculture, and patent for it is held by Wisconsin Alumni Research Foundation. Latter granted license to manufacture Cransweets to Cranberry Products, Inc., Eagle River, Wis.

### Closeup of Process

In operations at our Eagle River, Wis., plant of Cranberry Products, Inc., choice berries are shipped in directly from the company's bogs. Or they are delivered frozen from cold storage plants, where quantities are kept to enable year-'round production.

In our new $100,000 single-story plant, the berries are first hopper-fed to an inclined flight-conveyor, which discharges them into a 35-ft.-long ceiling-suspended stainless steel flume. This is the initial washing stage, following which they con-

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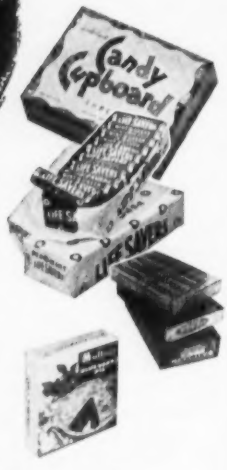


Much of the effort of selecting the proper protective papers and attractive design of the package can be wasted through improper packaging. At Battle Creek, we have spent 44 years working on protective packaging, giving careful attention to every detail. This meticulous detailing, design and precision engineering all combine to give you flavor sealed packages at lower cost.

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**BATTLE CREEK**
**packaging machines, inc.**
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tinue through a de-watering reel and are collected in a 90-lb.-capacity stainless hopper.

From here, the berries drop onto an 18-ft. rubberized canvas conveyor, where they get a thorough inspection. They are then chuted into a sump with overflow water from the flume. Water is pump-recirculated from sump to flume.

A second inclined flight-conveyor now elevates the cranberries into a rotary washing reel. Washed berries next go into a small hopper feeding the specially designed punching machine (H. D. Hume Co., Mendota, Ill.) that pierces them at 150-lb.-per-min.

In this operation, berries drop from the hopper onto a ½x2½-ft. conveyor belt that carries them under a rotary stainless steel drum (8x12 in.) containing thousands of stainless spikes spaced ¼ in. apart. These short spikes pierce the berries, which are then gathered in pans.

About 150 lb. of pierced whole berries are next charged into metal drums half full of sugar and corn syrup (varied). A vacuum (20 in.) is pulled, and the berries are then held about 30 min. so that they become completely impregnated with syrup.

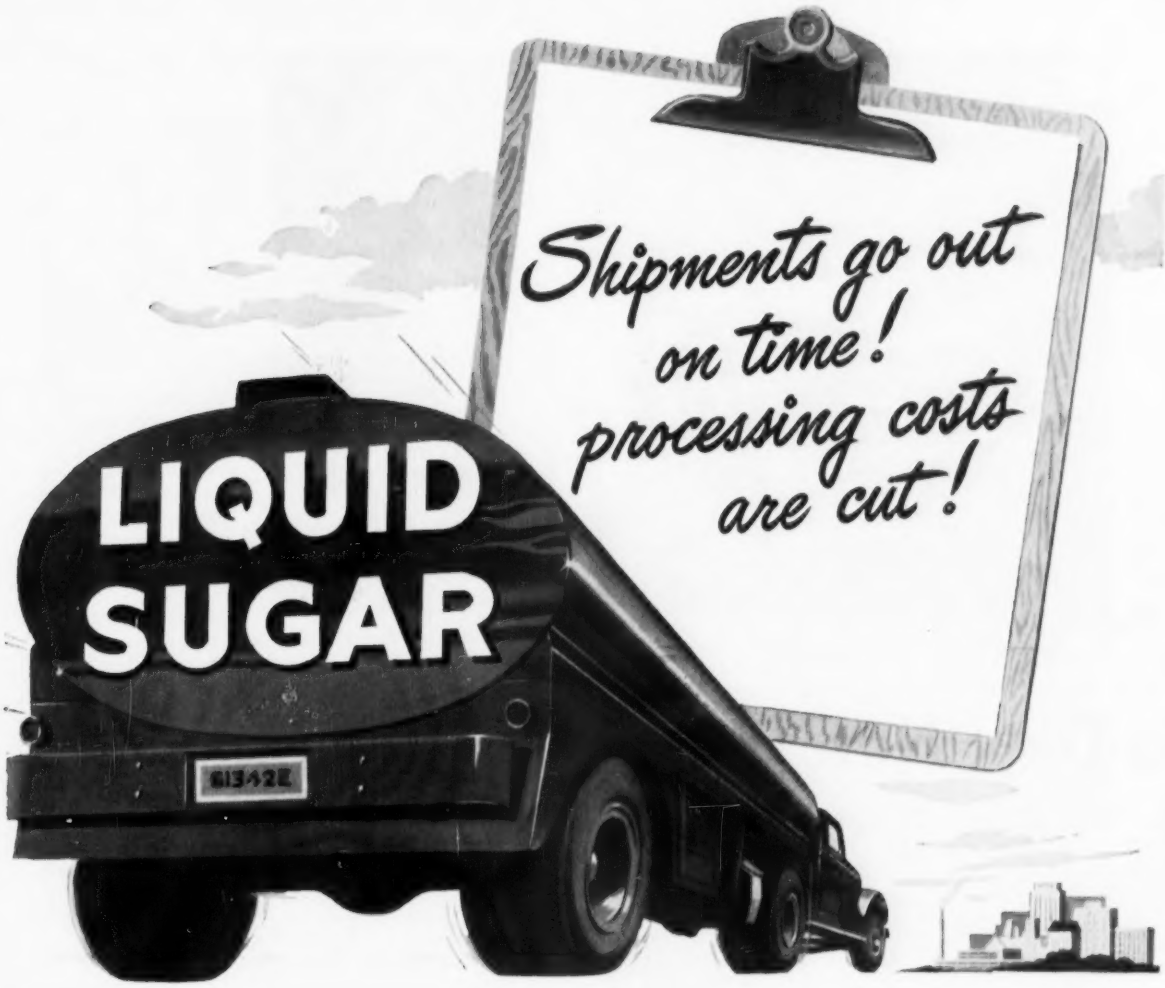
Syrup-sweetened berries are dipped out of the drums and, with the acidity adjusted, they are poured into 15-gal.-capacity jacketed kettles. Then after the heating in syrup to 180-190F., they are hot-filled into 12-oz. and 1-gal. glass jars. Berry counts can be varied from 1,500 to 3,000 per gal.

Jars are finally capped, cooled for an hour in an exhaust box with running water, labeled, and packed into shipping cases.

### Steps for Other Items

For the product used in the confectionery and baking trades, Cransweets coming out of vacuum drums are diced prior to kettle-cooking. Also, the pickled Cransweet product is prepared in a similar manner. Only difference is subjecting drum-charged berries to vacuum for a second time and for a full hour in a spiced syrup.

Thus, in addition to manufacturing the whole Cransweets, the company produces such other cranberry products as: (1) strained and whole cranberry sauce in No. 10 and 300 cans, (2) cranberry-orange relish in 12-oz. and 1-gal. jars, and (3) purees ready for use in sherbets, ices, ice cream, variegated-type ice cream, sundae topping, bakery fillings, and the like.

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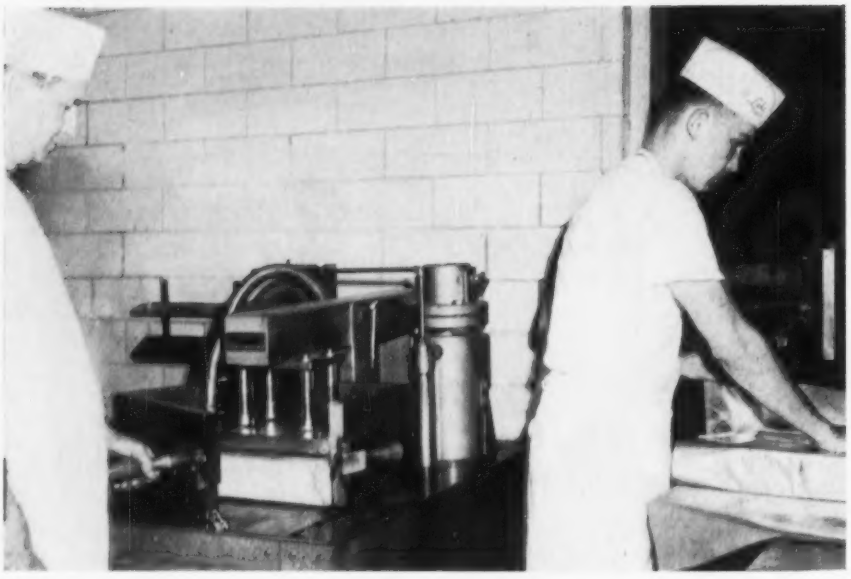


**TIME-SAVING** pneumatically operated machine uniformly pressure-seals double-wrapped 20-lb. cheddar slabs coming from wrapping table at right. Product is stored in this form for aging prior to cutting into wedges.

# They Now Package Better —*And Quicker*

**New technique first takes a lot of steps out of wrapping operation. Then performance is spurred with an advanced straight-through packaging line that can vary both product sizes and shapes**

**WESLEY WISE and JOHN V. ZIEMBA**

Respectively, Production Manager, Lake to Lake Dairy Cooperative, Kiel, Wis., and Associate Editor, "Food Engineering"

IT'S ONE THING to improve the appearance of your packaged product—and certainly quite another to lift that product into faster production.

► **Both these strides, however, have just been accomplished simultaneously at Lake to Lake Dairy Cooperative, Kiel, Wis. And into the bargain, operating steps have been saved and cost reduced.**

LLDC's production is handled daily out of 29 cheese vats (15,000 lb. each). But no longer does this plant puts its wrapped 20- and 40-lb. cheddar slabs back into hoops and then into cheese presses. And no longer does it hot-water-heat the hoops and tie up the presses for 3-hr. stretches.

Accordingly, steam-laden air in the cheese-making room is now a thing of the past.

### New Way

An entirely new system, featuring latest equipment, skirts the old routine to bring this all about.

Wrapped slabs are now pressure-sealed within 18 sec. by a pneumatically operated machine (Micardon Co.). And this has won greater sealing uniformity.

Slabs are brought into the boxing room, where they are loaded onto a stainless table. Here, press cloths are removed, and the slabs are wrapped with cellophane-foil laminate and then waxed kraft paper.

Next, the wrapped slabs are loaded into the press box of the pressure-sealing machine, which is equipped with sealing plates containing pump-circulated 170F. oil. Door of machine is closed and latched, and a control button is pushed to apply pressure from an 8-in. dia. air cylinder with control valves set at a pressure of about 60 psi.

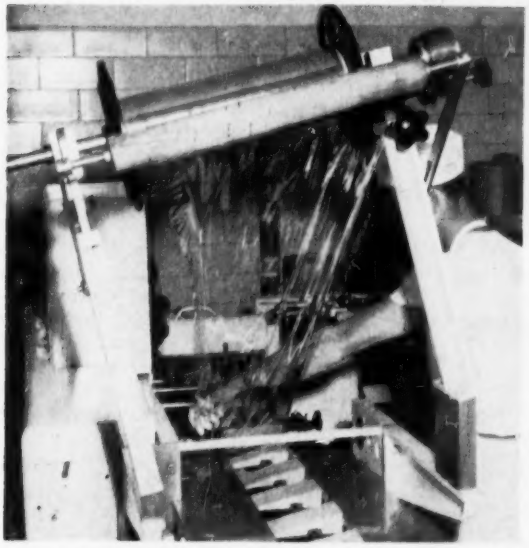
A timer now automatically starts up and a pilot light goes on. Then when an 18-sec. timed cycle is completed, the light goes off as a signal to remove the sealed cheese slab from the press box.

Thereupon, the slabs are loaded into sleeve-type cartons that are secured with steel straps and loaded onto pallets for aging.

### Pre-Packaging Routine

About 25% of the cheddars removed from aging storage go to the pre-packaging line. Here, 20-lb. slabs

# Wedges Are Film-Wrapped, Lamp-Heated, Pressure Packed



**STRAIGHT-THROUGH** wrapping machine takes thin-gage roll-fed Saran and wrap-seals it around cheese wedges.

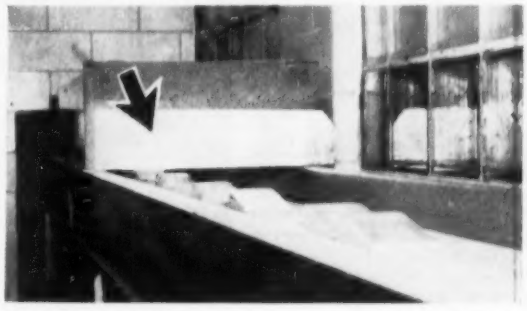
**UNIT PUTS** thermoplastic labels on wrapped wedges, using electric-eye registration.

are cut into wedges, which are then machine-wrapped, labeled, and pressure-packed in cartons.

In this operation, slabs are loaded onto a pair of 10-ft., waist-high angle irons. Steel straps are cut off, and slabs are removed from cartons and transferred onto a canvas belt. At this point, waxed kraft wrapper is stripped off, and slabs are then rubber-belt conveyed to the cleaning room for removal of foil wrap.

The cheese is now cut into two 10-lb. slabs by a hydraulically operated wire cutter. A second wire cutter forms each 10-lb. slab into 16 wedges (10 oz. each). These wedges are check-weighed and delivered to the machine-packaging line.

Cutter can be quickly changed to produce a variety of wedge sizes (also rectangular-shaped pieces).



**SURFACES OF WEDGES** are now softened—first by infra-red lamps, then by battery of incandescent lamps (arrow). This "snug-fits" the wrappers.

#### Film Wrapping

Wedge-shaped cheddars are hand-fed onto a stainless steel, chain-drive conveyor, with flights spaced on 6½-in. centers. The moving wedges of cheese then automatically drop into 75-gage unsupported Saran film, which is machine-formed into tube shape from roll-fed stock, positioned at an angle.

Side and bottom belts on the Campbell wrapping machine (Hudson Sharp Machine Co.) carry Saran-tubed wedges to a cutting head. Here, a rotary, single-bladed knife cuts the Saran film to length.

Wedges then proceed to the tucking unit, where ends of each wrapper are shaped up. Next, the cheddars are pushed through a device that folds end tails under them.

Machine-wrapped cheddars are then positioned to take the heating-shoe pressure that tack-seals sides and top of packages. Electric current supplied to heat-sealing plates—two for sides and two for bottom of packaged cheddars—is dial-controlled, with amperes indicated on four panel-mounted gages. Also positioned upon the

**WEDGES FINALLY GO** into cartons which, with flaps pre-glued, are then sealed in this pressure-packing unit.

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Chemiseal Packings and Gaskets were designed by specialists for corrosion, contamination and sanitation problems in the food and chemical industries.

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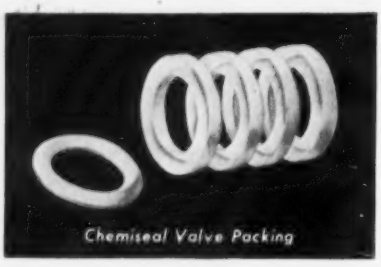
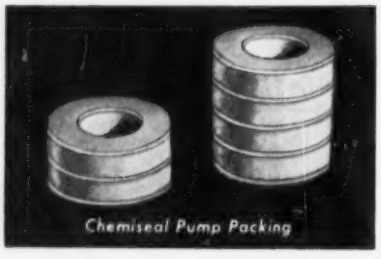

Chemiseal Valve Packing

**CHEMISEAL MECHANICAL SEAL.** An "all-TEFLON" Seal of pressure-balanced bellows design. Good for all mediums including fluids with suspended solids. Applicable to all pump or agitator shafts. Catalog No. MS-1155.


Chemiseal Pump Packing

**CHEMISEAL V-TYPE PACKING** is the ideal valve packing that seals with low gland pressures and operating torque. Extremely resilient, tough and anti-hesive—it will not seize the valve stem or shaft even when handling the most difficult solutions. Supplied in sets with square end adapters. Catalog No. TP-1255.

Chemiseal Teflon-jacketed Gaskets

**CHEMISEAL PUMP PACKING** is extremely effective for rotating and reciprocating shafts. Provides a low friction 2-way seal that not only prevents axial seepage, but also seals against shaft and stuffing box as well. Supplied in sets to meet specific requirements. Catalog No. TP-1255.

**CHEMISEAL TEFLON-JACKETED GASKETS** are available in any size, with a variety of filler materials suitable for glass, glass-lined, porcelain-lined and metal piping equipment. These fillers are protected on both faces and the inside diameter by the inert TEFLON Jacket. Catalog No. TG-953.

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TEFLON

UGS

**UNITED STATES GASKET CO.**
CAMDEN 1, NEW JERSEY

machine panel is a master temperature indicator, with horizontal scale. Capacity of the wrapping machine ranges up to 40 to 50 packages per minute.

### Labeling Details

Subsequently, the wrapped wedges continue to an automatic thermoplastic labeler (New Jersey Machine Corp.).

This machine has an electric eye for precise positioning of thermoplastic labels.

Heat activation of thermoplastic labels demands exact temperature control to minimized downtime of labeling machine. For this reason, close control of the machine's heating unit has been arranged through installation of a Capacitrol (Barber-Colman Co.). This device's core reactor varies input of electric heating element in accordance with system demands.

### Lamp Operation

Wrapped, labeled wedges now drop onto an 8 in. by 8 ft. inclined conveyor belt that carries them under a pair of 500w. infra-red lamps. Purpose is to soften the surface of the cheese for subsequent pressure-packing into cartons. The wrapper thus provides a skin-tight fit.

Packages are then automatically transferred onto a 14 in. x 40-ft. canvas-belt conveyor that feeds them below a battery of a dozen 300w. incandescent lamps and onto a stainless steel, carton-packing table. Latter lamps further soften the cheese for pressure-packing.

Finally, the wedges are double-layer packed, 16 to a scored, hinge-type, easy-opening carton that is manually set up. Glue is applied to front and side flaps, and carton is fed into a pneumatically operated carton-sealing machine (Green Bay Box Co.). This equipment operates under a medium-range pressure of 100-120 psi.

### Walls Tighten Wrap

Pressure is applied to all sides of each carton by constricting walls of machine's hopper. This seals the carton and tightens wrappers to wedges.

Here, control of the pressure is through an adjustable plate in the hopper opening.

Finished cartons drop out of the machine onto a short inclined rubber belt that feeds them to a 1x6-ft. skate-type conveyor. They're then loaded onto pallets, ready for shipment.


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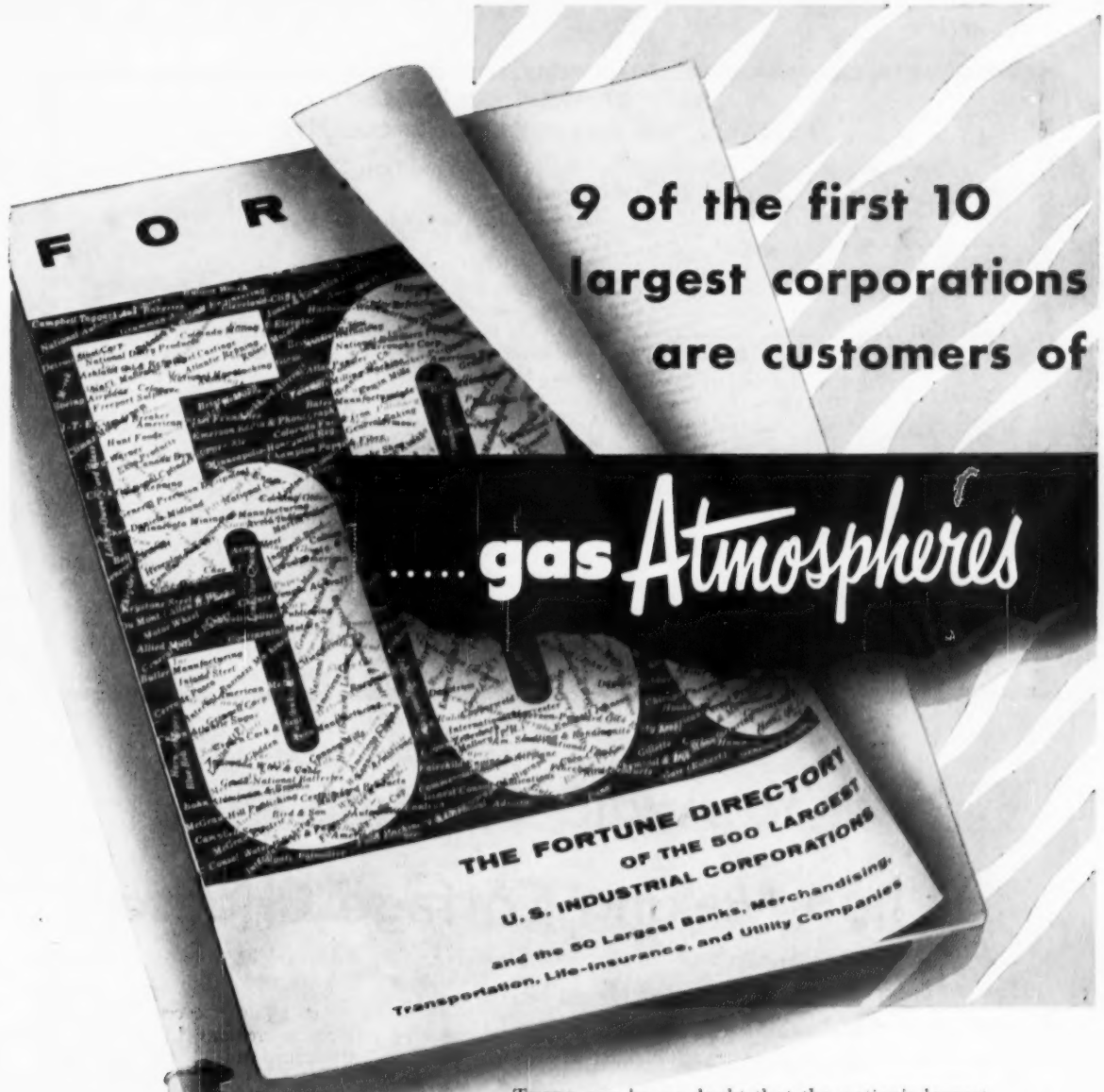
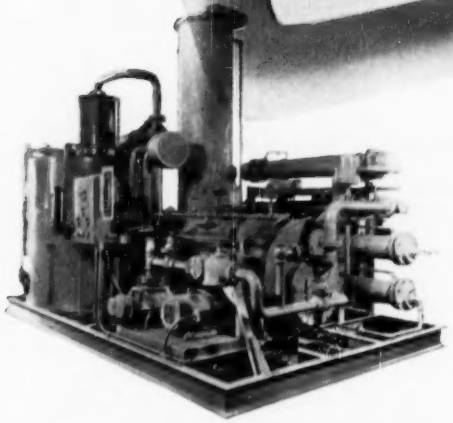
# 9 of the first 10 largest corporations are customers of

## ..... gas Atmospheres



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THERE can be no doubt that the nation's largest corporations are staffed with specialists who know their business. Men of proved ability to make intelligent decisions. Perhaps that's why *Fortune's* new directory held so much interest for us—for we recognized nine of the first ten leading industrial corporations as Gas Atmospheres customers. In fact, the booklet was fairly studded with names of concerns who are using Gas Atmosphere's Gas Generating Systems for processing foods, petroleum, chemicals, metals, etc.

If you have need for industrial gases in any amounts, why not join the leaders and specify Gas Atmosphere systems.

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**TESTS OF THESE CULTURES REVEALED THE GAS-PRODUCING CULPRITS**

| DESIGNATIONS | DESCRIPTION |
|---|---|
| 1R, 2R, 3R, 4R, 5B, 6B, 7B, 8C, 9C, 19, 20, 21 | Mixed strain lactic cultures from cheese plants |
| 3R (1 to 8) | Eight single strain isolates from culture 3R |
| 3D | Same as 3R, but obtained directly from commercial starter company in dry form |
| 4R (1 to 7) | Seven single strain isolates from culture 4R |
| 8D to 17D, 18, 22 to 33 | Mixed strain lactic cultures from commercial starter companies in dried form |
| 24-1 | Single strain isolate from culture 24 |
| 9596 | A.T.C.C. *Streptococcus cremoris* |
| Sc1 | *Streptococcus cremoris* 1 |
| S1E | *Streptococcus lactis* E |
| S127 | *Streptococcus lactis* 27 |
| LcF, 8081-82 | A.T.C.C. *Leuconostoc citrovorum* |
| 8086, 8358-59 | A.T.C.C. *Leuconostoc dextranicum* |
| LdF | *Leuconostoc dextranicum* |
| Ld688 | *Leuconostoc dextranicum* 688 |
| L-5-319, 16-9, 62-9, 2-5, 122-5, CAF-1, CAF-2, CAF-7, CAF-10, CAF-19 | Associative-type starter organisms from various laboratories |

# How to Avoid 'Floating Curd' When Making Cottage Cheese

**Studies put finger on certain cultures containing lactic streptococci that develop large quantities of $CO_2$ —and thus way is shown to curb this texture trouble**

**W. E. SANDINE, A. W. ANDERSON and P. R. ELLIKER**
Oregon Agricultural Experiment Station, Corvallis, Ore.

CAN THE MAKER of cottage cheese readily eliminate "floating curd"—the defect which, in late years, has become such a bane?

**In answer, a remedy is seen through recent careful studies. Here, the results reveal that the difficulties of floating curd and excessive foaming during the cooking phase of the operations can be abolished through use of cultures containing proper combinations of S. lactis or S. cremoris, together with the so-called associative aroma bacteria.**

One of the common undesirable effects encountered is the extreme shattering of curd, with consequent poor texture and loss of yield. So in an effort to isolate gas-producing organisms that might be responsible for the floating curd, preliminary studies were initiated—and they promptly eliminated yeasts and coliform bacteria. In short, the culprits had to be sought elsewhere.

Further investigations indicated that the responsible bacteria might be either lactic streptococci or *Leuconostoc* species in starter cultures.

Our study reported here represents an investigation of $CO_2$ production by mixed-strain lactic acid starter cultures, as well as single-strain lactic and leuconostoc organisms. And from this work came the new findings.

Cultures studied were: Known species of *Streptococcus lactis*, *Streptococcus cremoris*, *Leuconostoc dextranicum* and *Leuconostoc citrovorum*; mixed-strain lactic acid starter cultures; single-strain cultures isolated from mixed strain starter cultures and from samples of floating curd cottage cheese; and associate-citric acid fermenting streptococci, which were presumably members of the *Leuconostoc* genus (see culture box above).

Cultures were transferred every other day in sterile reconstituted low heat nonfat milk solids and incubated at 21 deg. C. for 18 hr.

For determining $CO_2$ production, 5% of culture was inoculated into sterile milk and 3-ml. aliquots of this placed in Warburg flasks, which were incubated at 30 deg. C. The direct manometric method described by Umbreit *et al.*[1] was used for measuring gas uptake and evolution in microliters.

Readings were taken every 30

min. over a 4-hr. period, and each reading was preceded by a 10 min. shaking interval. The $\alpha$ values used to calculate the flask constants were 0.026 for $O_2$ and 0.665 for $CO_2$.*

Single-strain cultures were obtained by serial dilution plating with a special medium developed for lactic streptococci[3]. Qualitative determinations for aroma production were run using King's modification[4] of Ritter's alpha-naphthol method.

#### Evaluation of Method

Preliminary results indicated that the method described could be used to distinguish gassy and non-gassy lactic acid starter cultures. It was found that $CO_2$ values obtained with the 10-min. shaking before each reading were higher than values obtained either without shaking or with constant shaking.

Eight-hour testing periods magnified differences in gas production, but the same relative gas-producing properties for the cultures could be observed in 4 hr. Manometric experiments demonstrated that acid production by the cultures had little effect on $CO_2$ evolution during the test period.

Results of the test demonstrated clearly the uniformity in amount of gas uptake and evolution by a culture when it is carried under controlled conditions. While some determinations were made on successive days, others were made after as much as 5 months interim. All values representing $CO_2$ evolution appearing in the adjacent tables are averages of triplicate determinations, unless they are otherwise indicated.

#### Plant Cultures Studied

Several lactic acid cultures were received from two different plants. Some of these cultures had caused floating curd, while others were being used routinely with no apparent gassiness. They were tested on the Warburg respirometer. It is apparent that all cultures that caused floating curd in the plants produced 3 to 5 times more $CO_2$ than cultures from which normal batches of cheese were produced. (See Table I.)

Two of the gassy cultures (3R and 4R) were plated out, and single colony isolates picked and examined on the respirometer.

At least two types of the strains were isolated from each of the gassy parent cultures. One produced little gas (less than 100 $\mu$l.) and no aroma compounds. The second produced large quantities of gas (greater than 400 $\mu$l.) and also aroma compounds.

Samples of cottage cheese curd that had floated during cooking were also found to contain these types. It was further observed that among each of these two types, both high and low acid producing strains were present.

Single strain isolates also were made from other gassy mixed lactic cultures, and gassy and non-gassy strains again were encountered. However, repeated isolations made from a number of low gas-producing cultures (less than 250 $\mu$l. $CO_2$ evolved in 4 hr.) failed to reveal any strains that produced greater than 50 $\mu$l. of $CO_2$ in 4 hr. This indicates either that they are absent or, if the gassy strains are present, they must occur in small numbers.

#### Commercial Cultures, Too

At this point it seemed advisable to establish the gas-producing characteristic of a number of representative commercial cultures after transfer in sterile reconstituted nonfat milk for several days to insure maximum activity. Table II shows the results of these analyses.

An arbitrary scale was established to rate the cultures for gassiness, based on the amount of $CO_2$ produced in 4 hr. Cultures producing 0 to 250 $\mu$l. $CO_2$ were designated as low: 250 to 350 $\mu$l. as medium; 350 to 450 $\mu$l. as high; and greater than 450 $\mu$l. as very high gas producers. It is evident that most, but not all, of these cultures showed low gas production.

During these experiments it was found that the same commercial cultures obtained from different sources (i.e. direct from the manufacturer and from different cheese plants) did not always show the same degree of gas production. However, each culture from a particular source, once it was received and kept on a daily transfer basis in our laboratories, remained constant in the volume of gas produced when tested at different times.

#### Other Cultures

Cultures identified as typical *S. lactis* and *S. cremoris* also were examined for gas production. Only 2 strains of each were tested and they

## Down to Points on Gas Production

**TABLE I — GAS PRODUCTION by Lactic Acid Cultures Obtained From Cottage Cheese Manufacturing Plants**

| Culture | History of Culture | $CO_2$ Produced, Microliters |
|---|---|---|
| 1R | Used in plant with no evidence of excessive gas production | 167 |
| 2R | | 150 |
| 5B | | 214 |
| 3R | Curd floated in all vats | 632 |
| 4R | | 549 |
| 6B | | 615 |
| 7B | | 554 |
| 3R-1[a] | Single strain isolates from 3R | 472 +[b] |
| 3R-2 | | 32 −[c] |
| 3R-3 | | 20 − |
| 3R-4 | | 417 + |
| 3R-5 | | 50 − |
| 3R-6 | | 45 − |
| 3R-7 | | 633 + |
| 3R-8 | | 43 − |
| 4R-1 | Single strain isolates from 4R | 534 + |
| 4R-2 | | 50 − |
| 4R-3 | | 35 − |
| 4R-4 | | 46 − |
| 4R-5 | | 727 + |
| 4R-6 | | 517 + |
| 4R-7 | | 53 − |

[a] Values for 3R and 4R isolates represent one determination. All others are averages of triplicates. [b] Aroma producers. [c] No aroma.

**TABLE II—GAS PRODUCED by Various Commercial Lactic Acid Starter Cultures**

| Culture | $CO_2$ Produced, Microliters | Rating Based on Gas Production |
|---|---|---|
| 3D | 209 | low |
| 8D | 225 | low |
| 9D | 196 | low |
| 10D | 179 | low |
| 11D | 201 | low |
| 12D | 133 | low |
| 13D | 195 | low |
| 14D | 141 | low |
| 15D | 65 | low |
| 16D | 195 | low |
| 17D | 220 | low |
| 18 | 324 | medium |
| 22 | 184 | low |
| 23 | 857 | very high |
| 24 | 179 | low |
| 25 | 212 | low |
| 26 | 1008 | very high |
| 27 | 806 | very high |
| 28 | 198 | low |
| 29 | 207 | low |
| 30 | 1027 | very high |
| 31 | 301 | medium |
| 32 | 273 | medium |
| 33 | 398 | high |

*The authors will provide further details of their manometric procedure on request.

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Los Angeles 54, California

showed low gas production. All the single-strain isolates obtained from mixed cultures that were identified as *S. cremoris* by growth temperature, salt tolerance, pH tolerance, and arginine hydrolysis studies, also showed low $CO_2$ production.

Qualitative determinations on the mixed lactic acid cultures indicated high production of aroma compounds by all gassy cultures. However, some non-gassy cultures also were active in aroma production, so the correlation was not definite. This led to study of the effect of associative types (presumably *Leuconostoc* species) on gas production.

In single-strain cultures, neither the A.T.C.C. *Leuconostoc* species, nor the associative types obtained from other laboratories, produced any significant quantities of $CO_2$ (Table II). Aroma production also could not be demonstrated by single strains.

They were then combined with different non-gassy single-strain lactic acid cultures (at the rate of 25% associative and 75% lactic culture), and the mixtures were then examined for aroma production. Both negative and positive reactions were observed, which confirmed again the original work of Hammer and Bailey.[4]

The combinations showing aroma production were tested for gassiness, and no increase could be demonstrated in repeated attempts after numerous transfers of the mixtures. It thus appears that aroma production may be realized without excessive gassiness by combining non-gassy lactics and non-gassy leuconostocs.

### Plant Trials Confirm Findings

Subsequently, a number of plant trials were conducted in which cottage cheese was made with high and low gas-producing starter cultures. High gas-producing cultures invariably resulted in floating curd and excessive foam formation during manufacture.

This difficulty also was accompanied in some instances by a tendency toward shattering and by poor drainage of the curd. Low gas-producing cultures yielded normal cottage cheese curd which, in some but not all instances, was characterized by less biacetyl aroma.

The direct relationship between the floating curd defect and the large volumes of $CO_2$ produced by the starter cultures establishes the major cause of this serious defect.

Consistency of $O_2$ uptake and $CO_2$ evolution by the starter cultures repeatedly examined in this study suggests that a stable metabolic reaction occurs which remains in balance under uniform culturing conditions. However, handling conditions, including such factors as freezing and over-ripening, might alter the strain dominance of a culture and allow the high gas-producing strains to become numerous.

Concern with these factors may be eliminated by selecting only low gas-producing strains for incorporation into mixed cultures.

The abundant aroma production by gassy mixed-strain cultures suggests that the gas-producing strains may be desirable for aroma in products like buttermilk, cultured sour cream, and cream for churning.

They undoubtedly also are beneficial from the standpoint of aroma production in cottage cheese, but represent a hazard in production of the floating curd and associated defects. If such cultures are used, modifications in manufacturing procedure may be necessary to minimize the effects of excessive gas.

All cultures of *S. lactis*, *S. cremoris* and leuconostoc types produced only small volumes of $CO_2$. It was possible therefore to combine associative organisms with non-gassy lactics to achieve a combination of sufficient aroma and active acid production without excessive gas production.

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*The above article is designated by Oregon Agricultural Experiment Station as Technical Paper No. 1005, Contribution of the Department of Bacteriology.*

*Specially acknowledged by the authors is the technical assistance of Mrs. Helen A. Hays and Prof. R. W. Stein, and also the contribution of test cultures by Dr. F. J. Babel, Purdue University; Dr. E. M. Foster, University of Wisconsin; Dr. F. E. Nelson, Iowa State College; Dr. C. F. Niven, Jr., American Meat Institute Foundation; and Dr. M. L. Speck, North Carolina State College.*

JACK B. RINCKHOFF (right), Chief Engineer, Sulphuric Acid & Phosphates Dept., Chemical Construction Corp., N. Y. City. Left, Michael De Piano, New York Cooper Alloy Representative.

# RINCKHOFF OF CHEMICAL CONSTRUCTION

## *answers 3 questions on Cooper Alloy Valves*

*Q. Mr. Rinckhoff, in specifying equipment for the $H_2SO_4$ plants that Chemico constructs around the world, what Cooper Alloy valve models do you buy most of?*

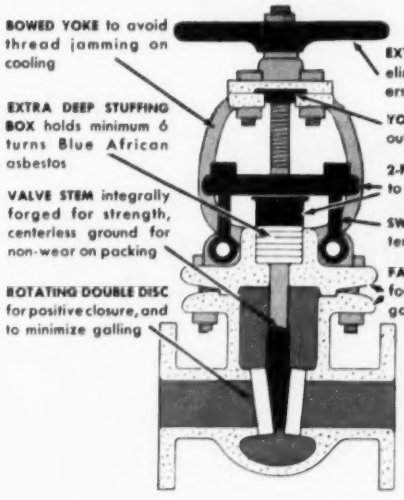
A. Over 80%, I'd say, are OS&Y type gate valves, in sizes 1"to 8"

*Q. What's your most important reason for buying Cooper Alloy valves?*

A. Availability. Your chain of distributors across the country and in remote parts of the world is of great importance to us. In foreign construction we have often specified Cooper Alloy because of this all-important availability.

*Q. What about design and quality?*

A. Vital. Valve design determines performance, and our specifications are rigid. As a construction company, we can't afford to jeopardize our reputation by installing questionable equipment. Cooper Alloy valves have passed our tough specs, and have my approval for all severe construction applications.


BOWED YOKE to avoid thread jamming on cooling
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VALVE STEM integrally forged for strength, centerless ground for non-wear on packing
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# How to Get the Most Out of Your Lift-Trucks

**Here's a proved preventive maintenance program that will minimize your truck down-time and so assure highest return on these versatile materials handlers**

**PART I—OPERATING ANGLES***

*This article was provided specifically for "Food Engineering" by The Materials Handling Institute, Pittsburgh and was prepared by Robert T. Scott and Walter Bleckmann.*

YOUR LIFT-TRUCK increases operating efficiency, enables you to produce on schedule, cuts handling costs, and pays dividends by upgrading labor to more productive work.

**However, it can do quite the opposite—and unfortunately does everytime it is undergoing repairs that could have been prevented by a planned maintenance program.**

Such a program, therefore, is No. 1. And it should be concerned primarily with the following factors that lead to breakdowns:

1. **Careless operation with inexperienced or irresponsible drivers.**
2. **Neglect of inspections and minor repairs.**
3. **Overloading.**
4. **Faulty lubrication.**
5. **Bad floor or roadway conditions.**

All of these can be minimized or eliminated through planned preventive maintenance that includes a proper concept of operator responsibility.

Whether your training program consists of formally scheduled classes or a breaking-in-the-man routine, the new operator must prove conscientious about the A-B-C's of his job. From the maintenance viewpoint he should—

A. Have acquired correct operating habits and handling skills.

B. Have a knowledge of the functions and limitations of his truck.

C. Be able and conscientious in its routine inspection.

D. Recognize characteristics that are breakdown danger signals.

E. Be conscientious in reporting damage and/or breakdown indications.

Too often the careless and slipshod habits acquired in passenger-car driving are permitted to be carried over into industrial-truck driving.

### Training Program

Here are some pointers on what might be termed "preventive maintenance driving:"

**STARTING:** Close the choke button as soon as possible after a cold engine is started. Excessive choking will cause unburned gasoline to leak past the pistons and dilute the lubricating oil. In cold weather, always allow engine oil in hydraulic systems to warm up and circulate freely before operating. If machine does not start in one or two minutes, operator should report it to foreman or other authorized personnel. He should not try to start it himself.

**SHIFTING:** In operating a straight clutch drive machine, clutch pedal should always be pushed to the floorboard before attempting to shift gears. This minimizes undue clashing of gears.

Riding the clutch is an all too common habit. This causes loss of tension on the spring and allows clutch to slip, resulting in rapid wear. It can also damage the throwout bearing by melting the grease through friction heat.

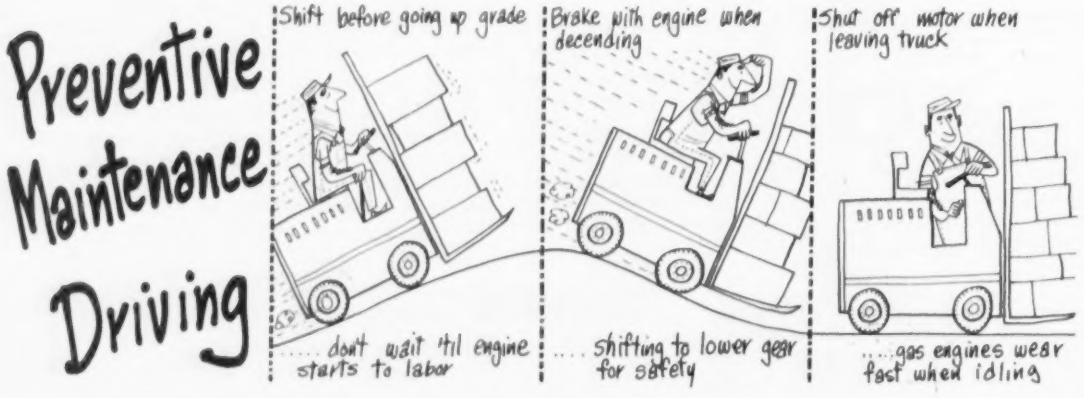
For engine protection and safety, always shift to a lower gear before descending an incline that requires excessive use of brakes. To make this shift, release clutch and shift to neutral, then re-engage clutch and adjust speed to permit shifting without clashing, finally declutch quickly and shift to the lower gear.

When going up an incline, shift to the lower gear *before* the engine starts to labor.

To reverse direction of travel come to a *complete* stop, then shift to reverse.

**TRAVELING:** Operators should

* Concluding Part II, scheduled for Feb. FE, will detail a practical program for making periodic checkups.


Preventive Maintenance Driving
Shift before going up grade
..... don't wait 'til engine starts to labor
Brake with engine when decending
.... shifting to lower gear for safety
Shut off motor when leaving truck
.....gas engines wear fast when idling

not pump the foot accelerator while traveling. This brings about worn cylinders and cylinder walls, besides consuming excessive fuel.

Trucks should never be left unattended with their motors running. Gasoline engines wear most rapidly when standing at idle speed.

High-lift trucks should not be used to carry loads over great distances (that is, more than 300 ft). There are more economical methods and equipment for extensive horizontal movement.

Operator should have authority to refuse to drive his truck over floors littered with chips, turnings, and other tire-destroying scrap. Oil and grease on floors are also to be avoided, since they deteriorate rubber tires. Railroad tracks should be crossed diagonally rather than at right angles, particularly when the truck is loaded.

**COLLISIONS:** While safety considerations are the prime reasons for avoiding collisions, they always result in truck damage. However slight the damage, all collisions should be reported so that the cause may be determined and eliminated This is also preventive maintenance.

**LOADING:** Responsibility for proper loading should rest with the operator. He should have the authority to refuse to move loads that may damage the truck. Overloading can result in broken lift chains and cables, can damage the hydraulic system, packing, and cylinders, and can overstrain engines and batteries.

The operator should know that, although a fork truck has a certain rated capacity, it cannot always handle loads of that weight. Getting down here to points, trucks are rated on an inch-pound capacity basis as measured by weight of load and its length from load center to a point on the truck specified by the manufacturer. This may be the heels of forks or the front axle.

Adding or removing attachments or accessories, such as a load grab, extension forks, or boom, affects the capacity rating of your truck. Rated capacities should be specifically discounted by the operator when he is traveling over uneven surfaces, down grades, or when transporting

## Operator's Checklist

These 12 points should be run through on every lift-truck at the start of each shift:

**Crank Case Oil:** It should be on or slightly below the "full" mark of the "dip" stick, never above. ☐

**Radiator:** If it is found necessary to add water in any significant quantity, this may be an indication of leaks or overheating. Most common cause of overheating are plugged radiator cores or fins due to accumulations of dust and lint or other materials. Blowing out periodically with compressed air will keep the cores clean. A loose fan belt will also cause overheating. ☐

**Filling of Fuel Tank:** Use clean gasoline from clean containers. When stored outside in steel drums, there may be a great deal of condensation due to atmospheric changes. If there is a suspicion that water is present in the gasoline, strain through a chamois-covered funnel. The chamois will remove both the water and foreign matter. ☐

**Air Cleaner:** Since the oil bath serves to clean air before it enters the carburetor, importance of this cleaner's proper maintenance cannot be over-emphasized. A check of its cup is required every 8 to 16 hr. In extremely dirty operations, it should be cleaned at least twice a day. The mesh screen will gradually accumulate dirt each day. And once every 40 to 50 hr. the complete cleaner should be removed and washed.

While this latter may be the responsibility of the maintenance mechanic, the importance of a daily check should be made clear to the truck operator. ☐

**Tires:** Pneumatic tires should be checked for specified pressure. Both pneumatic and solid-cushion tires should be examined for abnormally bad breaks, cuts, and gouges. Foreign matter should be removed. ☐

**Gages** should be checked with the engine idling. The ammeter should show a reading according to the output of the generator, especially when the engine is accelerating. The oil gage should show manufacturer-specified pressure. ☐

**Brakes:** Pedal should resist pressure when approximately one third of the way down. ☐

**Steering:** Operator should report more than 4 in. of play in the steering wheel. ☐

**Lift-tilt mechanism:** Work the hydraulic control levers and check for smooth operation of lift and tilt devices. ☐

**On gasoline-powered trucks** with conventional clutch drive, give the clutch throwout bearing grease cup one to two complete turns after every 8 hr. of operation. Make sure the cup is kept filled with manufacturer-recommended lubricant. ☐

**On battery-powered trucks** the battery should be checked to make certain it is fully charged. When fully charged or when changed between shifts, the new battery should always read 1275 or higher. ☐

**Finally:** Check horn, lights, and other special accessories. ☐

Prevent collisions
STOP
.. by obeying traffic rules
Don't overload
.... refuse to move load that may damage truck
Raise load as you near stack
.... this cuts strain on moving parts
Avoid sudden stops
.... reduce speed gradually

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overhanging loads. Warning systems that indicate overloading are available.

**STACKING:** If possible, the load should be raised as the truck is nearing the stack while coasting into position. This reduces strain on moving parts. When raising or lowering loads while standing still, the truck should not be left in gear with the clutch depressed. Excessive engine speed will not increase the speed of the hoisting mechanism and will only result in excessive wear. A good operator will learn to judge the proper engine speed by "feel."

**STOPPING:** Speed should be reduced gradually. Sudden stops are severe on the braking mechanism and a sharp halt is liable to cause the load to tilt forward and spill.

#### Operator Is Key

By making sure that the operator realizes he has a key role in the preventive maintenance program, the entire program is enhanced. No one should operate a truck other than the person to whom it is assigned. As much as possible, each man should work permanently with the same machine. This is important when the driver is under a production incentive system, where he may be inclined to overlook preventive maintenance regulations in favor of continued operation.

In case of apparent mechanical difficulty, it is the operator's responsibility to stop the machine and report the trouble immediately. He should not attempt to make repairs or adjustments himself, nor should he attempt to move a disabled truck except under the direction of a maintenance mechanic.

Here are danger signs which, if caught in time, will prevent major repair jobs:

1. Lack of power in truck, lifting mechanism, or accessory attachments.
2. Faulty lubrication.
3. Worn or damaged tires.
4. Poor brakes, difficult steering.
5. Missing parts, broken or bent rods, etc.

At the beginning of each shift, lift-truck operators should carry out a 12-point check on their machines (see accompanying panel).

#### Additional Pointers

Fire prevention on lift-trucks is also preventive maintenance, and your operator should be instructed to avoid unnecessary fire hazards. He

(Turn to page 147)

# Just 4 Easy Steps to Automatic Lubrication From One Central Point

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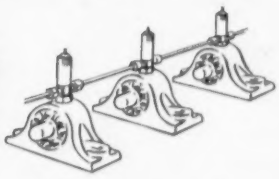
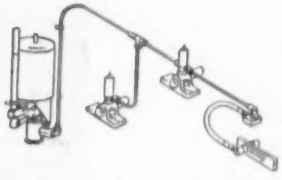
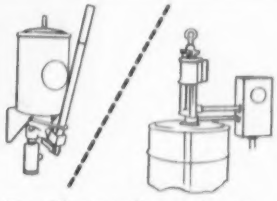


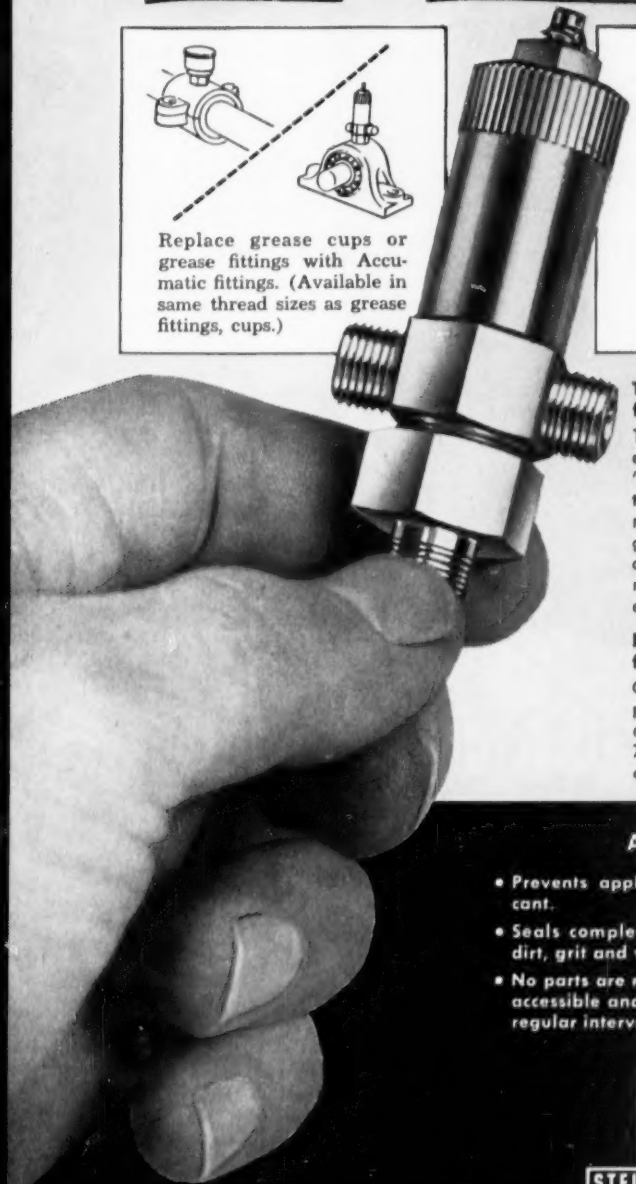
Connect Accumatic fittings with copper tubing. (Alemite has tubing, clips and accessories for easy installation.)



Connect sliding, rotary or oscillating parts into tubing system. (Flexible hose and swivels for moving parts.)



Provide central pump to supply lubricant to system. (Ordinary hand pump or fully automatic barrel pump.)



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**QUICK CHECK OF ECONOMIES Offered in Rundown of Costs for Dehydrofrozen, Frozen, and Canned Apricots**

| Charges | Style of Fruit: Dehydro-frozen | Frozen (5+1) | Frozen (9+1) | Canned Solid-Pack |
|---|---|---|---|---|
| **Plant investment (excluding freezing)** | $83,000 | $40,000 | $39,000 | ..... |
| **Processing costs per pound of pitted raw apricots** | 0.038 | 0.044 | 0.035 | 0.018* |
| **Raw materials per pound of pitted raw apricots** | 0.070 | 0.079 | 0.080 | ..... |
| Apricots | 0.070 | 0.070 | 0.070 | ..... |
| Sugar | ..... | .009 | .010 | ..... |
| **Selling price (f.o.b. processor) per pound of pitted raw apricots** | 0.135 | 0.154 | 0.144 | 0.134** |
| Processing costs | 0.038 | 0.044 | 0.035 | ..... |
| Raw materials | .070 | .079 | .080 | ..... |
| Selling and administrative costs, brokerage, and profit before taxes | .027 | .031 | .029 | ..... |
| **Cost to distributor per pound of pitted raw apricots** | 0.150 | 0.191 | 0.178 | 0.157 |
| Selling price (f.o.b. processor) | 0.135 | 0.154 | 0.144 | 0.134 |
| Storage, 6 months | .005 | .012 | 011 | .004 |
| Transportation to Chicago | .010 | .025 | .023 | .019 |
| **Cost to user per pound of pitted raw apricots** | 0.180 | 0.229 | 0.214 | 0.180 |
| Cost to distributor | 0.150 | 0.191 | 0.178 | 0.157 |
| Distributor's mark-up | .030 | .038 | .036 | .023 |
| Credit for sugar in product | ..... | .009 | .010 | ..... |
| **Net cost of apricot component to user per pound of pitted raw fruit** | 0.180 | 0.220 | 0.204 | 0.180 |

* Packaging cost—cans, cases, and labels only.
** Based on price quotation, Oct. '55.

With their weight and volume reduced by dehydrofreezing, apricots can be supplied for 10-20% less than conventionally frozen item, or at about cost of canned solid-pack . . . Detailed figures given for four styles of the fruit

## *How Dehydrofreezing*

# Cuts Packaging, Shipping Costs On Processed Fruit

**V. F. KAUFMAN and M. J. POWERS**
Western Utilization Research Branch, USDA, Albany, Calif.

HOW TO CUT shipping and handling charges for processed fruits has long been an urgent problem.

And it is particularly acute in the case of apricots, since almost all of this fruit used commercially is grown in California.

However, recent findings of USDA's Western Utilization Research Branch indicate a practical approach—processing the apricots by dehydrofreezing, a technique in which a food is partially dried, then frozen.

The major advantages are gained through reductions in both weight and volume, highly important in shipping this fruit to its distant markets. In addition, container and storage charges are less for the dehydrofrozen product than for conventional forms frozen with sugar, or canned solid-pack. And since the dehydrofrozen fruit is not packed with sugar, users don't pay the extra cost of shipping sugar under refrigeration.

But a key question is posed: Does the *overall* cost of processing and handling this new-form product justify its use? In short, do other savings offset higher plant investment?

To estimate the relative costs, we launched a comparative study of charges entailed in conventional processing of this fruit as against those anticipated for dehydrofreezing. Here, we already had valuable data from a project with processed apples*.

Our data indicate that dehydro-

* FE Dec. '51, p. 97, "Costs and Methods for Pie-Stock Apples." Favorable results with processed apples and apricots suggest wider application of dehydrofreezing as a food-preservation method.—*Ed.*

## Further Breakdown of Investment and Processing Charges

DETAILED COST ANALYSIS for Dehydrofrozen and Conventionally Frozen Apricots
Plant Capacity: 3,600 Lb./Hr. of Pitted Fruit

| Investment and Processing Costs | Total | Preparing | Drying | Packaging | Syruping* | Trucking | Freezing | General |
|---|---|---|---|---|---|---|---|---|
| **1. Dehydrofrozen Apricots, Pitted** | | | | | | | | |
| Plant investment** | $83,000 | $18,000 | $40,000 | $3,000 | ..... | $8,000 | ..... | $14,000 |
| Equipment | 56,000 | 13,000 | 30,000 | 1,000 | ..... | 6,000 | ..... | 6,000 |
| Building | 27,000 | 5,000 | 10,000 | 2,000 | ..... | 2,000 | ..... | 8,000 |
| Processing costs, per hr. | 135.42 | 34.15 | 42.20 | 23.84 | ..... | 5.04 | 14.29 | 15.90 |
| Labor | 48.30 | 10.12 | 25.47 | 1.84 | ..... | 1.84 | ..... | 9.03 |
| Power, water and fuel | 4.30 | .20 | 3.40 | ..... | ..... | .50 | ..... | .20 |
| Supplies | 27.00 | 4.00 | ..... | 21.00 | ..... | ..... | ..... | 2.00 |
| Charges based on investment | 27.53 | 5.83 | 13.33 | 1.00 | ..... | 2.70 | ..... | 4.67 |
| Machine rental | 14.00 | 14.00 | ..... | ..... | ..... | ..... | ..... | ..... |
| Custom work | 14.29 | ..... | ..... | ..... | ..... | ..... | 14.29 | ..... |
| Processing costs, per lb. | 0.038 | 0.010 | 0.012 | 0.007 | ..... | 0.001 | 0.004 | 0.004 |
| **2. Frozen Apricots (5+1), Halves** | | | | | | | | |
| Plant investment** | 40,000 | 11,000 | ..... | 6,000 | 4,000 | 8,000 | ..... | 11,000 |
| Equipment | 21,000 | 6,000 | ..... | 2,000 | 2,000 | 6,000 | ..... | 5,000 |
| Building | 19,000 | 5,000 | ..... | 4,000 | 2,000 | 2,000 | ..... | 6,000 |
| Processing costs, per hr. | 159.22 | 34.43 | ..... | 55.45 | 15.72 | 5.57 | 34.30 | 13.75 |
| Labor | 31.34 | 16.56 | ..... | 3.22 | 1.84 | 1.84 | ..... | 7.88 |
| Power, water and fuel | 1.45 | 0.20 | ..... | ..... | 0.05 | 1.00 | ..... | 0.20 |
| Supplies | 64.90 | ..... | ..... | 50.40 | 12.50 | ..... | ..... | 2.00 |
| Charges based on investment | 13.23 | 3.67 | ..... | 1.83 | 1.33 | 2.73 | ..... | 3.67 |
| Machine rental | 14.00 | 14.00 | ..... | ..... | ..... | ..... | ..... | ..... |
| Custom work | 34.30 | ..... | ..... | ..... | ..... | ..... | 34.30 | ..... |
| Processing costs, per lb. | 0.044 | 0.010 | ..... | 0.015 | 0.004 | 0.002 | 0.010 | 0.003 |
| **3. Frozen Apricots (9+1), Halves** | | | | | | | | |
| Plant investment** | 39,000 | 12,000 | ..... | 6,000 | 2,000 | 8,000 | ..... | 11,000 |
| Equipment | 20,000 | 7,000 | ..... | 2,000 | ..... | 6,000 | ..... | 5,000 |
| Building | 19,000 | 5,000 | ..... | 4,000 | 2,000 | 2,000 | ..... | 6,000 |
| Processing costs, per hr. | 126.22 | 20.76 | ..... | 51.72 | 2.67 | 5.57 | 31.75 | 13.75 |
| Labor | 31.34 | 16.56 | ..... | 3.22 | 1.84 | 1.84 | ..... | 7.88 |
| Power, water and fuel | 1.40 | 0.20 | ..... | ..... | ..... | 1.00 | ..... | 0.20 |
| Supplies | 48.67 | ..... | ..... | 46.67 | ..... | ..... | ..... | 2.00 |
| Charges based on investment | 13.06 | 4.00 | ..... | 1.83 | 0.83 | 2.73 | ..... | 3.67 |
| Custom work | 31.75 | ..... | ..... | ..... | ..... | ..... | 31.75 | ..... |
| Processing costs, per lb. | 0.035 | 0.006 | ..... | 0.014 | 0.001 | 0.002 | 0.009 | 0.003 |

* Excludes cost of sugar
** Excludes freezing facilities

**frozen apricots can be produced and shipped for about the cost of the canned product, or roughly 10-20% less than for conventionally frozen apricots.**

In this survey, we made certain assumptions limiting conditions to be covered, thus minimizing the variables. Even so, it must be noted that operating and marketing costs of plants with identical products may vary considerably.

Accordingly, our conditions were chosen to reflect costs that fall within the probable range for commercial operations. And emphasis was placed on keeping these costs comparative.

### Products, Operations Defined

This analysis covers costs of three types of apricot products, from initial processing to point of use:

1. Dehydrofrozen – automatically halved (Rapid-Cleave unit) and dried to 50% weight reduction.

2. Frozen – automatically halved (Rapid-Cleave unit) and packed 5 lb. of apricots to 1 lb. of 50-deg. Brix syrup, with 175 mg. of ascorbic acid added per pound of fruit and syrup.

3. Frozen–broken pieces automatically pitted (Elliott unit) and packed 9 lb. of apricots to 1 lb. of granular corn sugar.

Considered separately are costs for a fourth item, canned solid-pack apricots. They are produced as halves without added sugar or water, and usually are byproducts of other canning operations. The raw material may be that remaining after apricots for higher-grade packs have been selected.

In its processing, this fruit may be subjected to blanching or pre-cooking, which can cause losses as high as 30%. Because of the difficulty of comparing charges for a primary product and a byproduct, no production costs are shown for solid-pack apricots. Instead, quoted selling price (f.o.b. processor) is used as the basis of cost estimates on this pack.

Here are the five assumptions that were made in our estimates–

**1. Raw Material:** Same grade of apricots is used for dehydrofrozen and frozen products, and cost of fruit required to produce 1 lb. of pitted apricots is 7c. This figure includes costs of boxes, trucking of fresh fruit, purchasing, and processing losses.

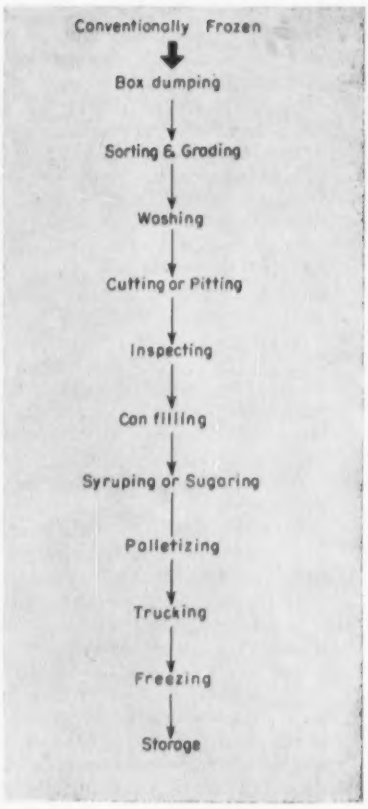
**2. Plant and Operation:** Plant capacities for both freezing and dehydrofreezing are estimated at 2 tons per hr., equivalent to 3,600 lb. of pitted apricots per hr. Facilities operate 600 hr. per season, and all investment costs are charged to apricot processing. Such costs (depreciation, interest, taxes, insurance, repairs, and maintenance) are placed at 20% per yr. on initial investment.

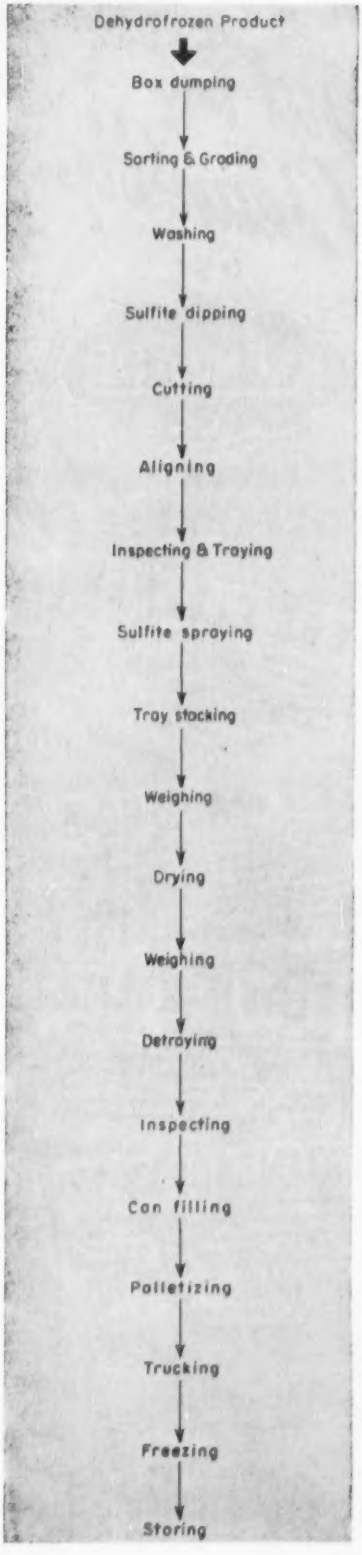
Charging all investment costs to a single product, as is done here, probably exaggerates them. Usually, equipment is used for several products, thus spreading indirect costs over a broader base. Drying facilities for the dehydrofrozen product constitute a large part of the total plant cost. If these dryers could also be used on prunes, which have a later and longer season, or if prune dryers could be adapted for dehydrofrozen apricots, investment charge per pound of product would be cut materially.

Product inspection is assumed to be the same for dehydrofrozen and frozen items, so that costs for this function are comparable. In commercial practice, fruit cut in halves usually gets more inspection than fruit in broken pieces.

Freezing is assumed to be done at

## Apricot Processing Flow Charts



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Exceptional emulsifying and saponifying powers scientifically balanced with rapid-action wetting agents for thoroughly removing stubborn fat and soil deposits. Ideal for hand cleaning of cookers, vats, fillers, etc. Rinses clean and bright. Tops in its field.

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Highly popular general cleaner especially useful on all wood and metal surfaces, tile, concrete floors, general processing equipment, ovens, hoods, etc. Rapid removal and dispersion of grease and heavy soil. Leaves no scum; rinses freely. Safe for hands.

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Non-corrosive organic acid detergent for cleaning high temperature equipment. Completely neutralizes and removes baked-on mineral deposits. The latest scientific approach to lime or "stone" dissolution. Eliminates abrasive methods.

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Concentrated sodium hypochlorite solution for bactericidal use in food plant operations. Rapid and effective for sanitizing all types of equipment. Clear solution, always ready for use. No dissolving or settling necessary. Leaves no sediment or residual film.

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and equipment for high temperature and heavy duty cleaning. Also fog sanitizing equipment and steam pressure cleaning.

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BELOIT, WISCONSIN

a refrigerated warehouse on a custom basis. Such facilities are available in many apricot-processing areas.

**3. Packaging:** Dehydrofrozen and frozen products are to be packed in 30-lb. slip-top cans. The equivalent contents expressed as pitted raw fruit, are for each product type: Dehydrofrozen, 60 lb.; frozen (5+1), 25 lb.; and frozen (9+1), 27 lb. Canned apricots are estimated in No. 10 cans, each case of 6 holding 40 lb.

**4. Storage and Transportation:** Storage costs are based on holding products for 6 months at commercial rates quoted for the San Francisco Bay area. Transportation charges are for shipping from California to Chicago at current carload rates.

**5. Other Costs:** An allowance of 20% of selling price (f.o.b. processor) is made to cover selling and administrative costs, brokerage, and profit before taxes. Mark-ups by distributors are set at 20% for dehydrofrozen and frozen apricots, and 15% for canned products.

No allowance is granted for sales promotions of the dehydrofrozen item in excess of that usually devoted to frozen or canned products. However, special promotional effort may be necessary during the introductory period of a new product.

Our accompanying flow diagrams show major processing steps for dehydrofrozen and frozen apricots, respectively. Proposed operations and equipment for the dehydrofrozen product were selected on the basis of laboratory and experimental commercial runs, and from general processing and equipment data. Such a line has not yet been tried commercially, but it would probably operate more satisfactorily and at cost lower than was realized in experimental commercial runs. Processes and equipment proposed for frozen apricots closely follow commercial operations.

### Revealing Data

The table seen on page 94 shows hourly plant investment and processing costs for apricots dehydrofrozen, frozen (5+1), and frozen (9+1).

Plant investments do not include freezing facilities, since the short season for apricots would not justify so large an expenditure unless other crops were also to be processed. Processing costs reflect the assumption that machine cutters for apricot halves are used on a rental basis, while machine pitters for broken pieces are owned by processors.

Our lead table summarizes all charges and shows costs to the user. Although these costs are influenced by the assumptions made, their relative order of magnitude probably will be maintained under most conditions.

As indicated, plant investment for dehydrofreezing is much higher than for freeezing, primarily because of the difference in cost of drying facilities. Probably a producer of dehydrofrozen apricots would modify existing drying facilities, or if new ones were built, would use them for other commodities.

Processing costs for the same unit operations vary for dehydrofrozen and frozen products, but differences tend to cancel out when total processing costs are figured. Charges for the drying step in dehydrofreezing are more than compensated by extra costs for packaging and freezing of frozen products.

The frozen (9+1) product has a lower preparation cost due to the different method of pitting. Cost of the syruping operation is primarily that for ascorbic acid, sugar being figured as a separate item under raw material.

Here, now, is a comparison of selling prices (f.o.b. processor), as calculated from Table II, and broker prices quoted in the San Francisco Bay area at the end of the '55 processing season.

| *Product (Per Lb.)** | *Selling Price, ($)* Calc. | Quoted |
|---|---|---|
| Dehydrofrozen | .27 | .26 — .28 |
| Frozen, (5+1) | .13 | .13 — .14 |
| Frozen, (9+1) | .13 | .115 — .13 |
| Canned, solid-pack, 12/No. 10's | ... | 10.75 |

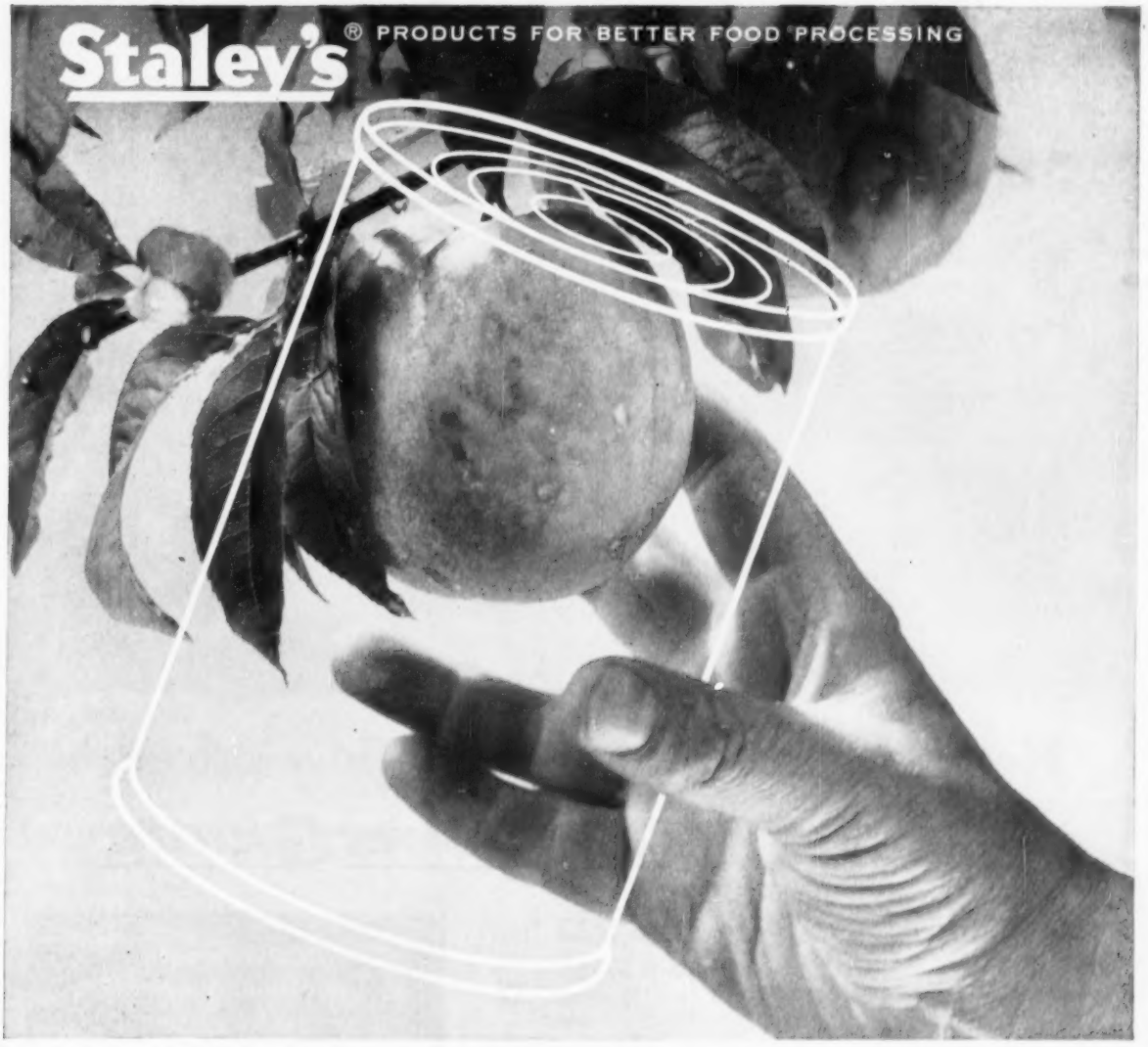
* Except last item.

As shown, price calculated for the frozen (5+1) product is the same as that for the frozen (9+1) apricots. However, the average of quoted prices for these items differs by about 1c. per lb.

This discrepancy may be due to: (1) Variations in quality of raw materials commonly used, (2) differences in amount of inspection labor, and (3) the fact that some of the prices quoted for frozen (5+1) products are for apricots cut on hand-fed machines.

Hand-fed machine cutting is more expensive than self-feeding machine cutting, but the former results in virtually all of the fruit being cut on the suture line. In the latter method, any apricot of spherical or near-spherical shape may not be properly aligned for cutting on the suture.

Costs in the lead table show net charges to the user after a credit is allowed for sugar in the product. It is assumed that the value of this sugar to the user is the same as its cost to the processor.




# How to capture and hold natural fruit colors at their peak...*and keep them from "fading"*

**Easy low cost way to give your brand that "fresh-picked" look —the kind Mrs. Consumer buys again and again and again**

It's disheartening, isn't it? Disheartening to have those bright, mouth-watering colors of your highest grades—so eye-appealing when they were packed—become discolored by the time Mrs. Housewife serves them. And it's so unnecessary, too, thanks to Staley's Sweetose Enzyme Converted Corn Syrup.

For Sweetose holds maximum color . . . gives better gloss . . . retains the "sheen" that says *your product* was fresh picked. That's because Sweetose better protects the "natural pigments" in your red fruits . . . retards the oxidation of Vitamin C that causes "browning" . . . contributes other appetizing appearance factors as well.

Get *all* the facts. Learn how Sweetose and Staley's bulk handling system not only speeds production, cuts costs—improves flavor, body, quality—*but* steps up your sales by holding natural fruit colors. See your Staley Representative or write, wire or phone today.

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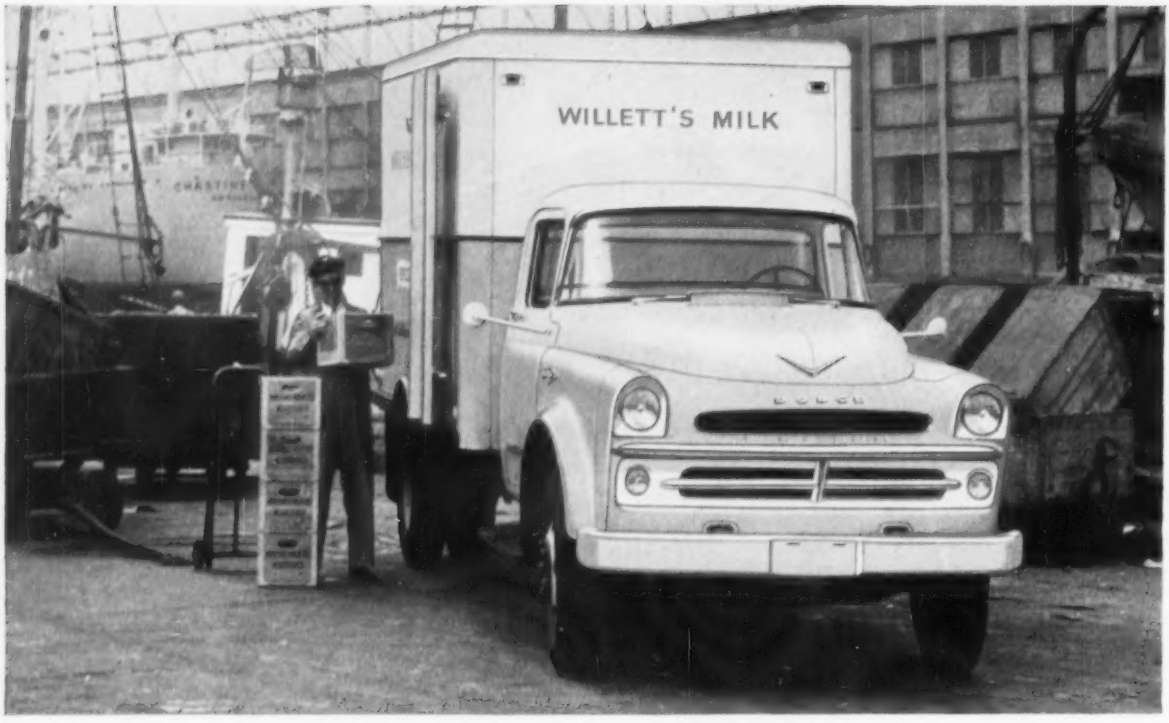



# Now . . . most power of the low-priced 3

# New DODGE *PowerGiants*

## 1957 line-up gives you up to 232 hp.

Dodge tops the low-priced field in V-8 power by a big margin—actually delivers as much as *31% more!* This *extra* power in reserve saves engine strain . . . wear . . . excessive repairs. What's more, Dodge V-8's use *regular* gas, help keep your cost per ton-mile *down!*

**Extra payload capacity.** You can haul more—up to 73% more in the 300 model pick-up, for example.

**Extra handling ease.** Exclusive push-button automatic transmission*! Sharpest turning and easiest steering in the industry!

See the new *Power Giant* line-up now at your Dodge dealer's. You'll see features that prove it pays to get your Dodge dealer's deal before you decide on *any* truck.

**Available on all low-tonnage and Forward-Control models.*

**DODGE meets your hauling needs!**

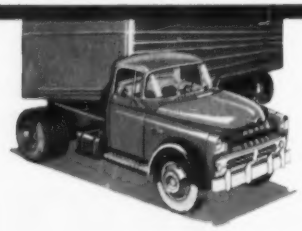
| Conv. Models | Max. G.V.W. | Max. G.C.W. | Max. V-8 HP. |
|---|---|---|---|
| 100 | 5,100 lbs. | — | 204 |
| 200 | 7,500 lbs. | — | 204 |
| 300 | 8,800 lbs. | — | 204 |
| 400 | 15,000 lbs. | 26,000 lbs. | 197 |
| 500 | 18,000 lbs. | 32,000 lbs. | 197 |
| 600 | 21,000 lbs. | 35,000 lbs. | 197 |
| 700 | 23,000 lbs. | 45,000 lbs. | 216 |
| 800 | 25,000 lbs. | 55,000 lbs. | 222 |
| 900 | 30,000 lbs. | 65,000 lbs. | 232 |
| **Forward-Control Models** | | | |
| P300 | 9,000 lbs. | — | 204 |
| P500 | 15,000 lbs. | — | 204 |
| **C.O.E. Models** | | | |
| C500 | 18,000 lbs. | 32,000 lbs. | 197 |
| C600 | 21,000 lbs. | 35,000 lbs. | 197 |
| C700 | 22,500 lbs. | 45,000 lbs. | 216 |
| **Tandem Models** | | | |
| T700 | 32,000 lbs. | 45,000 lbs. | 216 |
| T800 | 36,000 lbs. | 55,000 lbs. | 222 |
| T900 | 46,000 lbs. | 65,000 lbs. | 232 |

# DODGE TRUCKS

WITH THE *FORWARD* LOOK

Pick-ups

Stakes



Tractors



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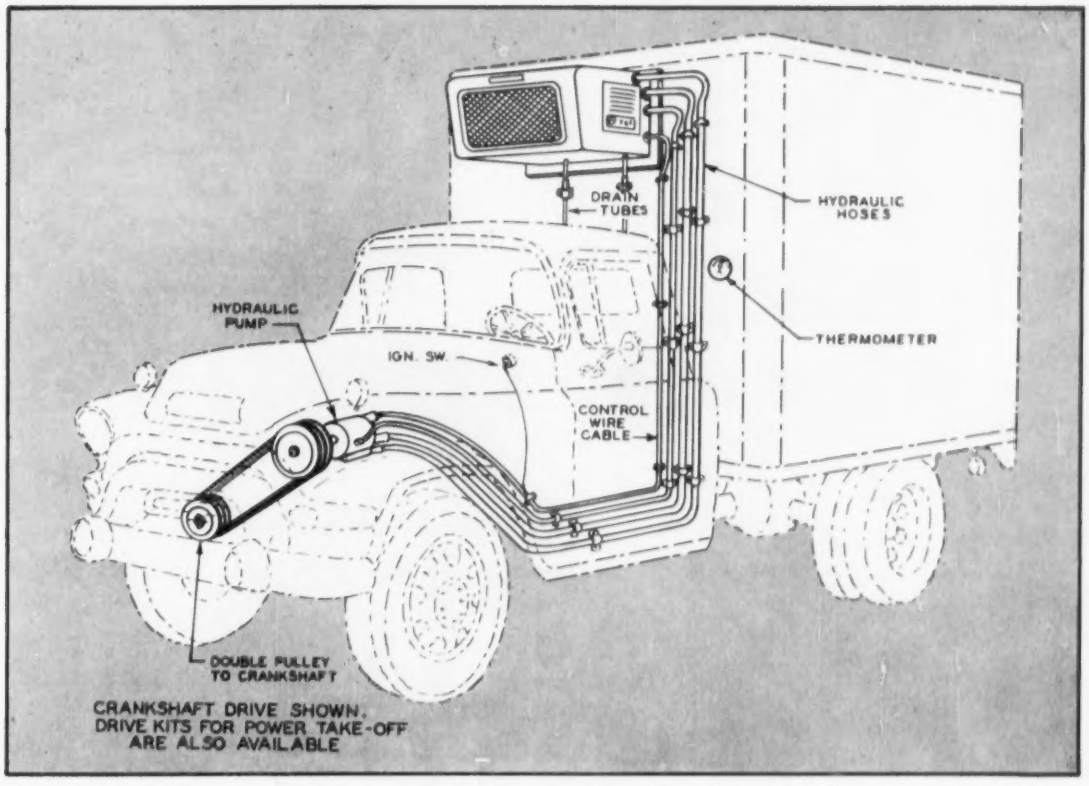



SCHEMATIC shows how hydraulic hoses and control cable link crankshaft pulley and pump to refrigerating unit over cab.

# Lightweight Cooling Unit Powered by Truck Engine

PROGRESS CONTINUES in the development of differing systems for assuring proper temperature control for fresh and frozen foods shipped in trucks.

One of the latest offerings is a system that eliminates the extra gas engine commonly required to power truck-body refrigerating units. Instead, it employs a hydraulic pump driven off the truck's own engine.

This new system comprises a lightweight "package" unit with automatic temperature control and defrosting. Known as Thermo-King Model H (U. S. Thermo Control Co., Minneapolis) it combines hydraulic pump, hydraulic motor with connecting hoses, and two-section refrigerating unit for a wide range of truck temperature control. To date, it is not adaptable to trailers.

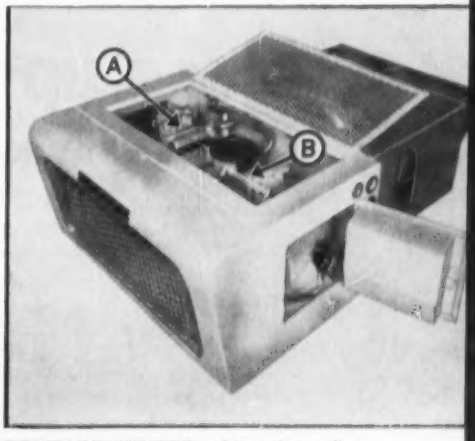
Key to operation of the hydraulic system is the spare horsepower generated by the truck's own engine. Using this power to run a refrigerating unit is not new. It has been done by electrical means. However, the Thermo-King unit is reported as the first to use a hydraulic system.

### Earlier Application

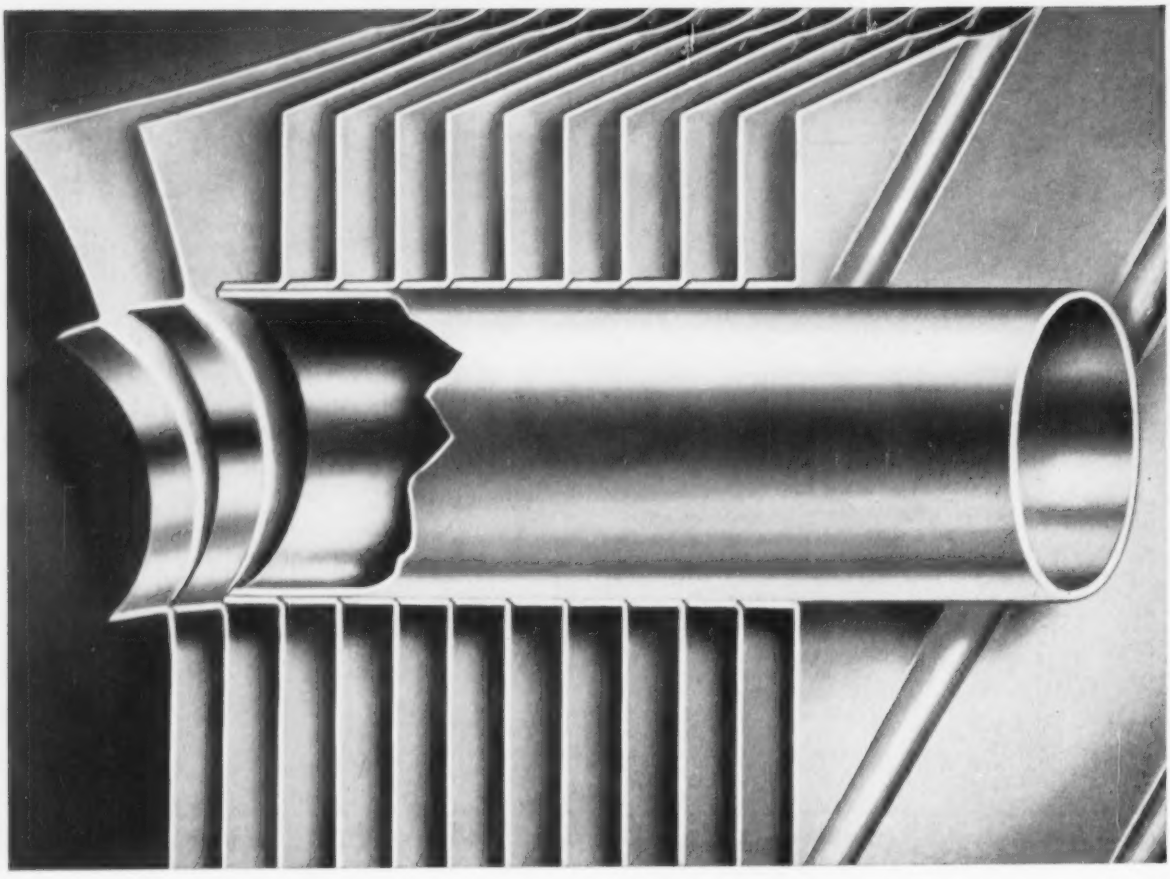
One electrical system (FE Apr. '56, p. 89) has an alternating current generator driven off the truck engine. The current is rectified and regulated into a constant 90 v. direct current to operate compressor and evaporator. Another system (FE Jan. '54, p. 48) features a patented hydraulic clutch, belt-driven off the propeller shaft. The clutch is controlled by an electric solenoid connected with the thermostats in the truck body.

The Model H units are currently in use at Armour & Co., Swift &

(Turn to page 148)




COMPARTMENTED refrigeration unit has compressor (A), hydraulic motor (B), and condenser (hidden by panel) in front section. Rear portion holds evaporator and is placed inside truck body.



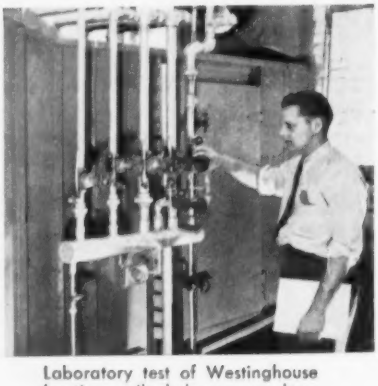
# Close up . . . or on the job . . .

## You'll See SAVINGS with Westinghouse Heating Coils

Westinghouse continuous plate-fin surface heating coils mean ease of installation, high performance with maximum operating economy, and long life on the job . . . plus these extra advantages:

- Low air resistance produces greater heat transfer at lower fan HP demands.
- Choice of fin materials . . . aluminum or copper, continuous plate-fins.
- Available in eighteen sizes, seven fin widths and three fin types to meet all your needs!
- *Permanent Mechanical Bond:* tubes are heat expanded into plate fin collars, forming a permanent bond for maximum heat flow from primary to secondary surface . . . provides greater efficiency!
- Available in heavy duty wrought iron piping with helical steel fins . . . for continuous duty high pressure systems and industrial process work . . . *a Westinghouse exclusive!*

Call your Sturtevant Division Sales Engineer for complete details for *your* heating coil requirements, or write Westinghouse Electric Corporation, Dept. 13A, Hyde Park, Boston 36, Massachusetts.



Laboratory test of Westinghouse heating coils helps assure long heating life at rated performance.

## WESTINGHOUSE AIR HANDLING

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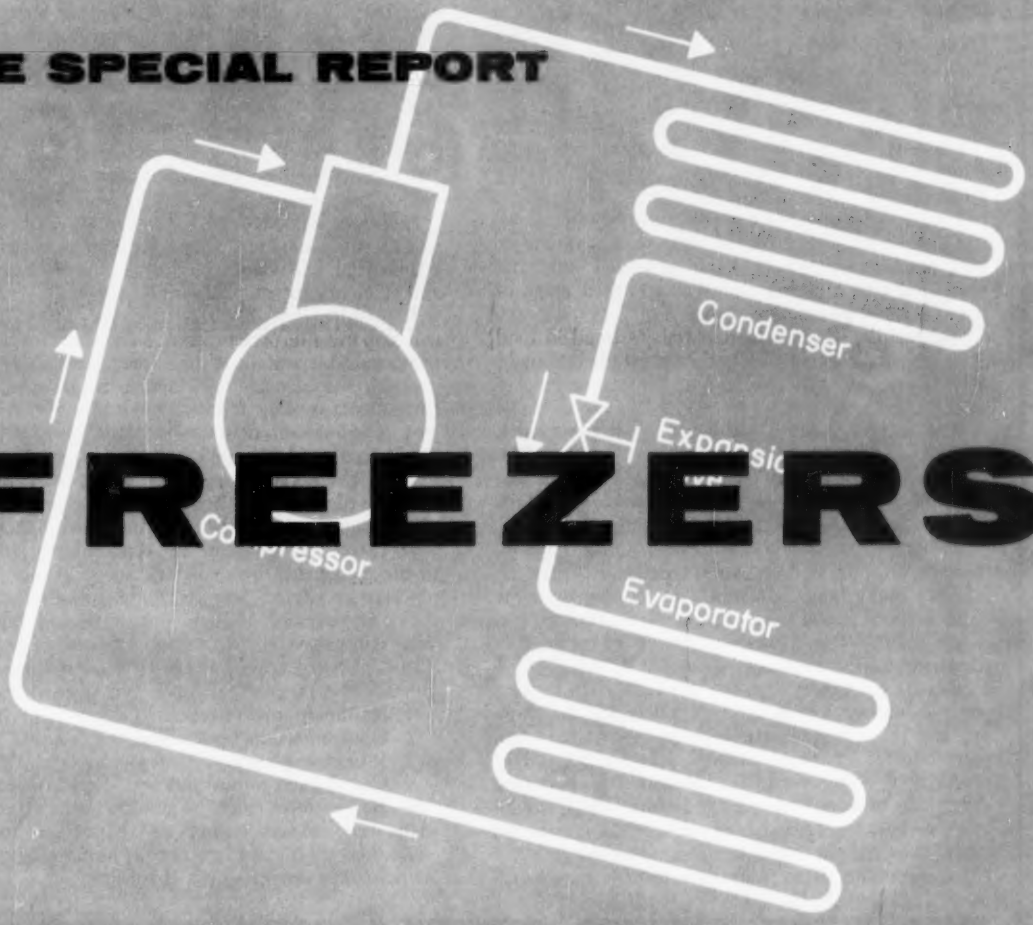
J-80596

**FE SPECIAL REPORT**




# FREEZERS

**Up-to-the minute engineering facts on today's new and faster units–**

- Continuous plate freezers
- Four "hot" blast freezers
- Direct-immersion freezers
- Continuous liquid freezers
- Plate, tray, and room units
- Equipment manufacturers

# What Freezer Do You Need?

**ROBERT J. KELSEY**
*Assistant Editor, "Food Engineering"*

CONTINUOUS OR BATCH? . . . packaged or loose bulk? . . . air blast or plates?

These are some of the vital decisions on freezing equipment that a processor must make before he jumps into 1957's competitive game of packing frozen foods.

**For, keeping pace with this fast-booming field, equipment suppliers have come up with a variety of new machines—many of them perfected only last year—that give a packer almost any desired range of flexibility and production capacity.**

Meanwhile, it's evident that today's trend in food freezing parallels that of all other plant operations in moving away from manual batch methods and toward continuous, high-speed machines.

**But despite all this emphasis on continuous units, no one should get the idea that some of the older freezing methods—particularly pressure-plate freezers, tray-and-cart tunnels, and blast rooms—are finished. They aren't.**

In fact, they have been steadily improved and, indeed, are preferred for some types of freezing.

Also, many large processors are looking over the field of continuous units with a very cautious eye, while maintaining their considerable investment in the hand-loaded freezers.

Reason for this is that the standard plate freezers carry relatively low price tags, compared to those on the present automatic, continuous units. And they cost far less to maintain.

Also, the pressure-plate cabinets are compact. They can be bought in standard sizes. Thus, expansion need not be paid for in advance, as is the case with many of the large, continuous freezers.

Furthermore, many processors—notably those packing specialty products—have too low a production rate to be able to afford the fast, non-stop units now on the market. For example, to fully utilize a continuous plate freezer, a packer needs a minimum production of about 100 pkgs. (10 oz.) per min.

All points that give pause, yes. However, they certainly aren't crimping the development—and use—of the new high-performance freezers. And further engineering is sure to eliminate bugs.

Still using the conventional refrigeration principles, several companies have new units on their drawing boards that will give even wider product flexibility and efficiency to the processor.

It may be, though, that the freezer of the future will not use the present compression and expansion of gases to spark heat transfer. Radio Corp. of America has recently exhibited an experimental refrigerator that chills foods through electronic action.

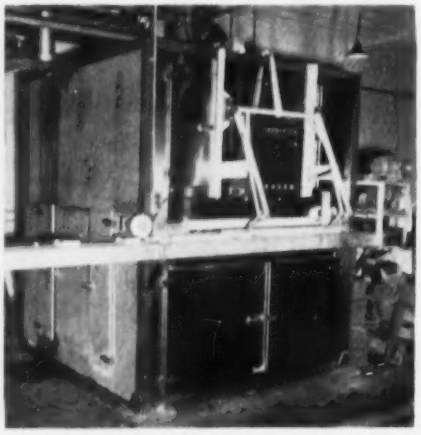
And almost simultaneously, Arthur D. Little has announced a freezer that employs magnetic action to plunge materials to near absolute zero. This follows the discovery that many substances are warmed when magnetized and chilled when demagnetized.

If these methods can be economically adapted to the food field, the shape and scope of food freezing may be altered radically in the future.

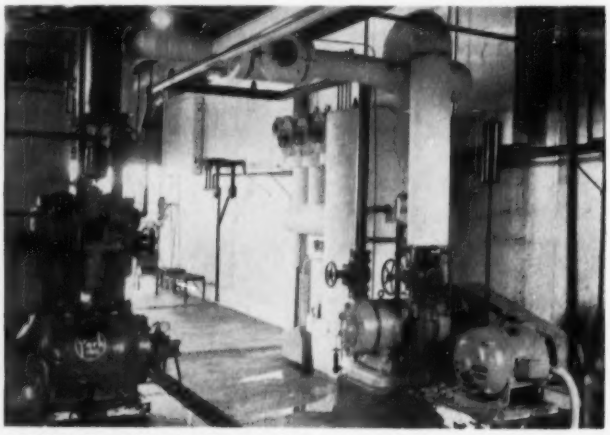
For the present, though, processors and suppliers alike must strive to extract top efficiency from conventional refrigeration means. The equipment available for this purpose falls into five, general classes:

1. **Automatic plate freezers.**
2. **Continuous air blast units.**
3. **Immersion freezers.**
4. **Continuous liquid and semi-liquid machines.**
5. **Batch units, such as double-contact pressure-plate, tray-and-cart tunnel, and blast-room freezers.**

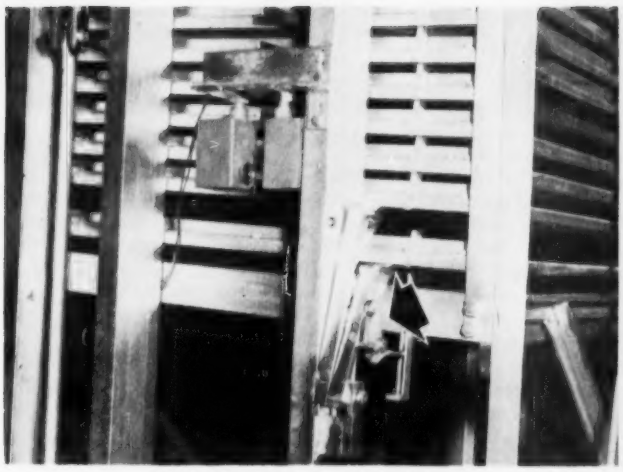
Because of the top interest in automatic, continuous freezers, we will cover them first:

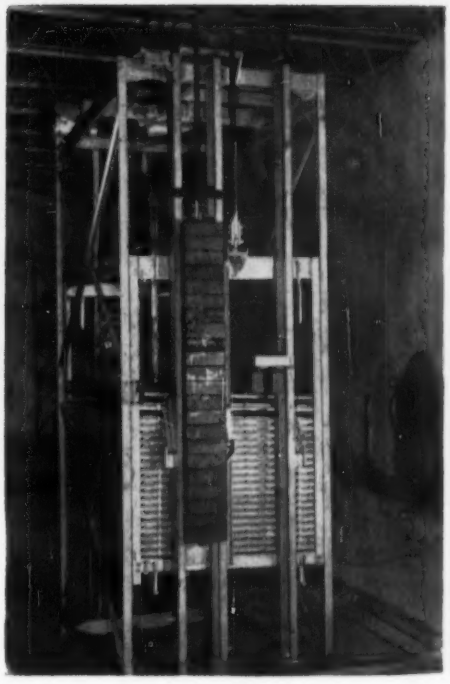


**AUTOMATIC PLATE FREEZERS** slash direct labor costs, handle packaged foods—but they are expensive to buy and maintain.



**AIR-BLAST BELT FREEZERS** have a relatively low price tag, and are usually used for loose-frozen products. But, they have less efficiency than plate freezers and take up a lot of plant space.





**KEY CONTROL** on York's continuous plate freezer are the dogs (photo, above) that spread plates for loading. Cam (arrow) is tripped by angle-iron trigger and locks out dogs so that the plate carriage can return to bottom position. Entire freezer mechanism (photo, right), minus the insulated box, is set in a shallow pit. Note chain-and-counterweight lift for the carriage.

# Continuous Plate Freezers

**Three units on the market lead the swing from batch and loose-product methods to non-stop freezing in consumer size packages**

**DEFINITE ADVANTAGES are cited for freezing pre-packaged products. For one thing, it eliminates an extra handling. In a properly designed and constructed package, it also cuts down on dehydration of the product.**

**Ice cream and other semi-liquid and liquid products are universally hardened in this manner. And in the last few years there has been a decided trend toward freezing fruits and vegetables, fish products, and other solid foods in the package.**

**Paper-cartoned products can be frozen in either an air-blast freezer or a plate unit. But many authorities say the plate unit has the edge in efficiency. Pressure on the packages—from either a hydraulic source or simply through the weight of plates and packages—produces a flat top and bottom on the carton. Thus, the box handles easily and stacks well in shipping cases and display cabinets. And the direct contact between packages and refrigerated plate surfaces gives very good heat transfer. Also, in plate freezers there are no fans to create an added heat load.**

**Thus, much effort has been expended in putting this method of plate freezing on a continuous basis. And today, there are three units on the market to choose from:**

## Unitized Plate Freezer

One device is the automatic, plate freezer sold by York Corp., York, Pa. This machine is suitable for a wide range of food products. In fact, it is now being used for many fruits and vegetables, steaks, fish sticks, and ice cream.

The unit consists of a series of refrigerated plates, mounted loosely in an elevator cage. The whole mechanism is enclosed in an insulated, refrigerated room. An external ram slides groups of packages between the plates. Two or more of these unitized freezers can be combined for increased production.

Number of plates in unit is governed by the thickness of the product package. But, the only real limitation is head room, for the entire pack of plates must be lifted up past the loading station. Standard machines handle packages from $\frac{3}{8}$ to 2 in. thick. But special units have been constructed for cartons up to $4\frac{1}{2}$ in. thick.

A typical installation of this freezer is located at SeaPak Corp., St. Simons Island, Ga. Here, fish sticks are frozen at −50 deg. plate temperature, in a single unit, at the rate of about 34 packages per min. The freezer holds a total of 1,680 cartons in 20 layers (6 rows of 14 packages per layer).

The loader operates this way: Packages approach unit in single file on a continuous conveyor. When 14 cartons accumulate, machine operator presses loading button and a horizontal bar pushes packages off the conveyor, through an opening in the freezer wall, and into the waiting slot between two freezer plates.

As a row of warm packages enter, previously frozen packages are advanced one row. The last row, at the back of the freezer, slides out onto a belt leading to a caser.

When six rows of packages are loaded, a counting device in the control system inactivates the feeder and lifts the freezer plates to the next station. Control is then restored to the feeder. This interlock prevents misloading of the plates, and frees operator from counting the rows.

When the last station (bottom one) is full, the cage automatically drops, and opens the first two plates for refilling. It takes about 50 min. to load the freezer at SeaPak—just the time needed to freeze the 8-oz. packages.

In the freezer, two 2,500-lb. counterweights balance plates, packages, and the elevating cage. Cage is raised and lowered by sprockets and chains.

Loading cycle starts with the cage lowered, and the top plate and next-to-top one in line with the loading mechanism outside the cold room.

As soon as the counting control shows a plate slot has its full load, a cage motor raises the plate cage to bring the next slot into position. As the plate stack goes up, eight plate-spreader dogs—which hold plates in loading position—swing out of the way. Under spring tension, however, they fall into place again, between the next pair of plates, when carriage has risen far enough for them to clear.

Control switches, operated by the dogs, then reverse the motor and the cage is lowered a short way. The exact distance is governed by a time-delay relay that stops the hoisting motor.

During the lowering, each of the two plates slated for loading come to rest on four dogs—leaving a space wide enough to slide packages between the plates. The top four dogs support all plates and packages above the loading station. The bottom dogs support only the plate on which packages are slid.

To prevent packages from being crushed between the loaded plates, steel spacing lugs are bolted to the plate ends. These can be changed for different-sized cartons.

When all stations are full, cage rises to a top limit switch. During the movement, cams on the cage trip four catches, which lock spreader dogs clear of the plates. Plates are thus free to descend when the top limit switch reverses the cage motor. Cage drops to a bottom limit switch, then rises to first loading position. During the drop, four pushers release the latches holding the dogs, and the latter fall into place ready to support plates in loading position.

### Refrigeration Facts

At SeaPak, the plate freezer is served by a 2-stage compressor installation and condenser, supplied by York Corp. The system operates off a common receiver with other ammonia circuits in the plant.

Both booster and high-stage compressors are reciprocating machines with automatic valve lifters that permit unloading of individual or groups of cylinders under partial-load conditions. The booster compressor is an 8-cylinder, 25-hp. unit. The high-stage machine has four cylinders and is rated at 30 hp.

Refrigerated plates in the freezer are not mounted exactly horizontal, but are tilted slightly. Liquid ammonia enters at the low edge and traverses internal, square tubes. Gas is drawn off at the high edge. This arrangement prevents trapping of bubbles, and minimizes tendency toward liquid surge.

The system is protected against liquid carry-over by thorough trapping.

Plates receive the ammonia through flexible rubber hoses that run from a manifold on the liquid ammonia line. Similar rubber hoses, conduct gas and some liquid to pipes that lead to a liquid trap, high up on the freezer frame in the cold room. Gas is drawn from trap to the booster compressor. Here, suction is maintained automatically at 15 in. vacuum to give the plate temperature of −50F.

The system also includes a 14 in. x16 ft. condenser and a 20 in.x8 ft. intercooler.

Condenser is supplied with cooling water from an evaporative cooling tower. But plans are now underway to replace this latter device with an artesian well, because the semi-tropical climate at St. Simons Island tends to run extremely high wet bulb temperatures. Cooling water temperatures at the condenser intake climb as high as 90F. in summer. The new well is expected to supply ample water at a constant 76F., summer and winter.

### Controls Specified

The main power motor for the cage is a 1½ hp., 3-phase, 220v., reversible, induction gearmotor. It is mounted in the cold room atop the freezer framework, and is controlled by two reversible electric line starters.

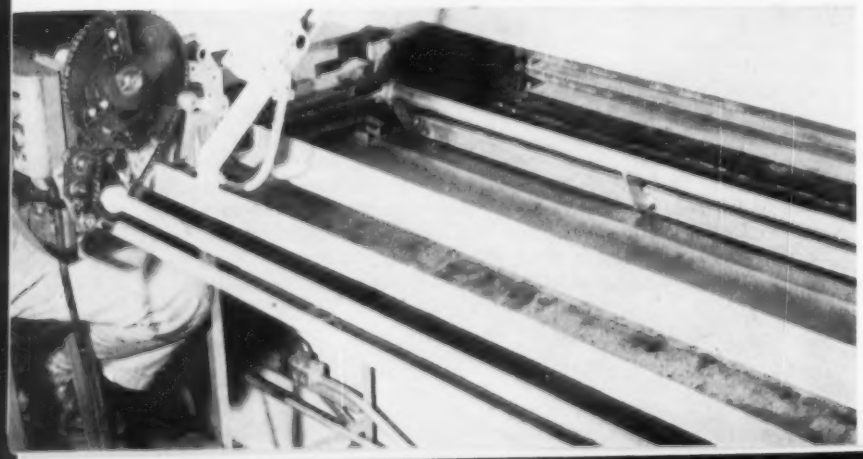
An electric brake minimizes any tendency of the cage to overrun positions or drift under varying load.

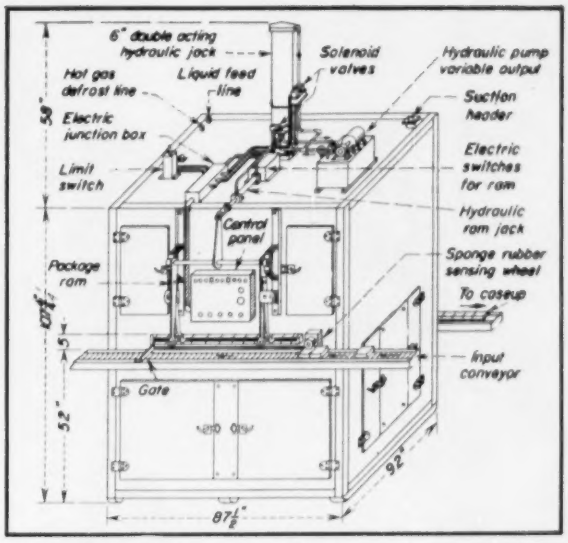
A stepping relay is employed to count the number of times the loader operates at each plate station. It is interlocked with cage lifting controls to initiate changes in loading positions after the correct number of packages have been loaded.

Two ¼-hp. reversible motors operate the loader. These are controlled by two small starters.

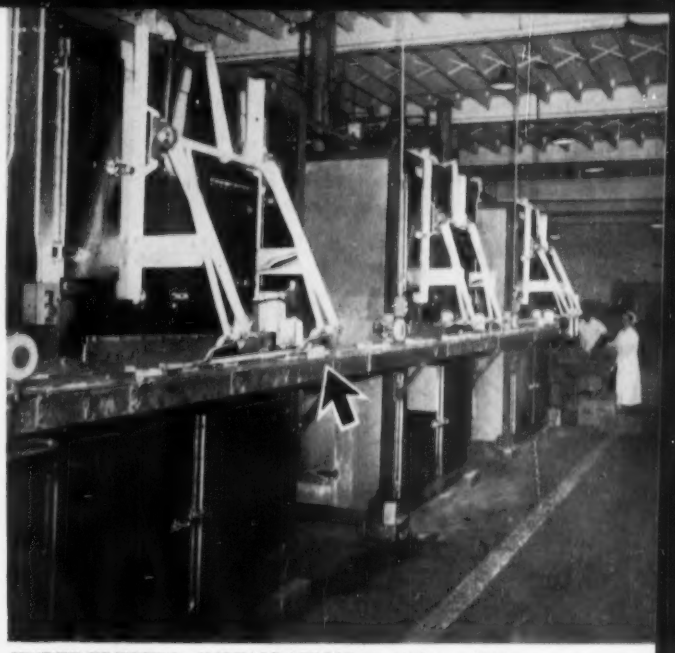
To accomplish defrosting, hot ammonia gas (at 60 psi.) is turned into the plate coils, forcing the liquid ammonia charge into the suction line. The complete defrosting operation takes about 4 hr.

**CHAIN-ACTION** loading ram slides a row of packages into the plate station on the York unit. Device is controlled by electric switches and driven by a reversing motor. Manual push button starts motion.






**INTRICATE** electrical and hydraulic circuits govern loading action of Amerio's continuous plate unit. Control panel (center) has lights to indicate phases of operation.



**THREE-FREEZER INSTALLATION** at O'Donnell-Usen Fisheries Corp., Gloucester. Electric gates (one at arrow) automatically pass cartons from one unit to the next.

# Fast Hydraulic Freezer

Another continuous plate freezer —made by Amerio Contact Plate Freezers, Inc., Union City, N. J.—is a fast-acting unit featuring use of hydraulic power to activate the carton ram and carriage hoist.

Noteworthy installation of this equipment is seen at O'Donnell-Usen Fisheries Corp., Gloucester, Mass., where three of the freezers are teamed together to automatically handle cartoned fish sticks.

Each of the special units has 17 loading stations (standard quota is 15 on this freezer). And a single plate will hold 208 cartons (4x5 in.), arranged 13 wide and 15 deep. It takes about 45 min. to load each freezer at the present plant production rate of 4,420 cartons per hr. But plant men say the freezers will take 145 cartons per min. in a pinch.

As in the York unit, Amerio floats the plates in the lifting carriage, which is formed by four rods that attach to a non-freezing bottom plate and pass through holes in a similar top plate. Four guide rails keep plates and carriage squarely in line. A double-acting hydraulic piston, fastened to the top plate, raises and lowers the unit.

As plates are raised, six dogs snap into place between the plates. This action triggers a Microswitch, which reverses hydraulic piston and lowers the carriage. The dogs support all plates above the station being loaded. Bottom plates drop to leave a space for loading packages.

When all the stations are loaded, plate carriage rises to a top limit switch. Spring-loaded plate dogs are retracted by a spring-loaded cam rail, and plate pack descends to freezing level. At this point, the hydraulic piston exerts about 150-lb. pressure on the packages—through the solid top plate—to speed freezing. Compression of the packages is controlled by plastic spacer sticks.

### Loading Mechanism

Package loading ram operates with four basic movements. Sequence of these actions is determined by four Microswitches.

In intermediate position (1), ram is poised directly over the incoming packages—ready for the full-forward stroke (2) that unsticks frozen packages already between the plates. Returning from this stroke, ram drops to full reverse (3) behind the packages. Last movement is the loading stroke (4) that pushes unfrozen cartons between the plates and ejects a line of frozen packages from the rear of the freezer.

The unique breakaway stroke — used only by Amerio — eliminates strain on unfrozen boxes if cartons in the freezer stick to plates (a fairly common occurrence when moisture gets into the freezer).

Loading stroke is triggered by a special sponge-rubber wheel located over the incoming carton conveyor.

As the last station in the first freezing unit is loaded, a stop gate in the carton conveyor line opens automatically, and packages go to the second freezer.

A variable-output hydraulic pump (Racine Hydraulics & Mach'y., Inc.) is now used by Amerio to supply the power for ram and hoisting piston. Fluctuating pressures are necessary to handle increased demand during changeover period, when cartons bypass one freezer for the next.

At O'Donnell-Usen, freezing is supplied by a pressurized ammonia recirculating system (Amerio also can supply a gravity-flow full-flooded unit). Each freezer requires about 25½ tons of refrigeration. Suction pressure is zero, with a plate temperature of —28F. (However, system is designed to operate at 10 in. vacuum and —42F. plate temperature.)

Liquid ammonia enters the insulated cabinet by a 3-in. vertical header. Freezing plates are connected to this line by flexible rubber hoses. Orifice plates insure even distribution of ammonia, and a 4-in. suction line collects liquid and gas from the plates. Defrost is by the reverse-flow hot gas principle.

# FOAMGLAS®

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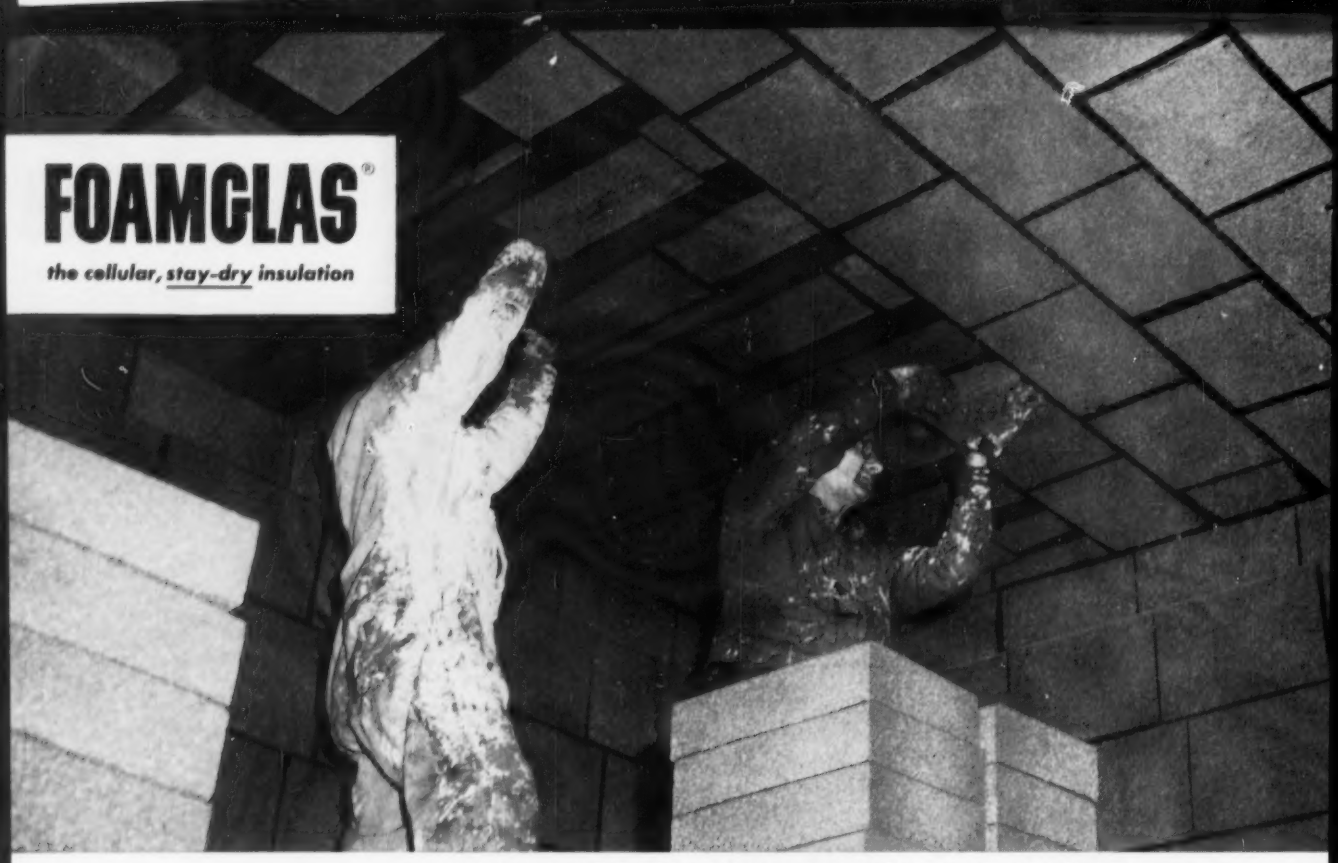

Workmen are installing lightweight, dimensionally stable blocks of 4" FOAMGLAS in T-Iron ceiling of new Welch Grape Juice freezer. Free-standing walls of FOAMGLAS—which help support the ceiling—require no extra structural support because of the insulation's unusual strength and rigidity.

## Welch Grape Juice saves 10% on cold room construction by insulating with strong, stay-dry FOAMGLAS

The Welch Grape Juice Company found a new money-saving technique to build freezers and coolers at plants in Brocton and Westfield, N.Y. FOAMGLAS with its unique combination of structural strength and constant insulating effectiveness, made this new technique practical.

According to Welch: "We saved valuable time and at least 10% on construction costs with our new type of low temperature enclosure for freezing and storing grape juice concentrates. Key to the design was our use of FOAMGLAS as both structural wall and insulation."

Each of the new Welch cold rooms is surrounded by an insulating envelope of FOAMGLAS. It's used in all walls without support from building structural members . . . in free-standing partitions . . . in pan and T-iron ceilings . . . and under all wearing floors. Moisture-proof FOAMGLAS is dimensionally stable, rigid and takes compressive loads of seven tons per square foot without crushing. Thus, it enabled Welch to eliminate the cost of masonry back-up or supporting studs. And separate vapor barriers were unnecessary.

This completely inorganic cellular glass material provides virtually permanent insulating effectiveness, too. As Welch concludes, "Since FOAMGLAS is moisture-proof, its efficiency doesn't fade. That keeps down the load on our refrigeration equipment. Operating costs are held at a constant low level. In fact, our refrigerating requirements for these cold rooms should be no higher in ten years than they are today."

See for yourself how *you* can benefit when you insulate with FOAMGLAS. Send today for a free sample and directions for six easy tests to perform in your own office. You'll prove that FOAMGLAS is *your* ideal insulation! Write . . .

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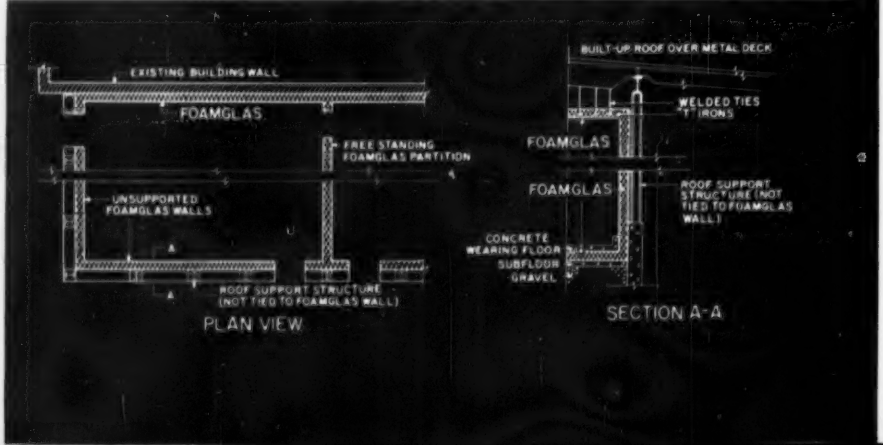



Detail showing use of FOAMGLAS in walls, free-standing partitions, ceiling and floor of new Welch Grape Juice freezer. Note section showing how FOAMGLAS stands free of structural supports for roof.

**LOADING INDEXER** sends 16 packages to each of the 8 freezing levels in the Proctor & Schwartz plate machine installed at Supplee. Counter (A) ticks off packages, then starts a hydraulic motor that lifts pivoted conveyor to the next station. Pressurized dry air in plenum (B) keeps out room air.

## Giant, Single-Unit Freezer

Still another approach to the problem of continuous plate-freezing is a large automatic unit (maker, Proctor & Schwartz, Inc.), just installed at Supplee-Wills-Jones Milk Co. (Div. of National Dairy Co.), Philadelphia.

Used here as an ice cream hardener, the machine handles rectangular pints and half-gallons that are prebundled into gallon units. Throughput is 1,870 gph., and a package goes from 22F. to 0F. (center temperature) in about 2½ hr.

Packages enter unit on 8 levels in rows of 16 cartons, and total holding capacity of the plates is from 4,224 to 4,736 packages.

The freezer contains 16 zinc-sprayed steel plates, arranged in 8 pairs. Each one is 13½ ft. wide and 22 ft. long. Set at a slight angle, these plates afford a gravity "push" to help the packages along through the freezer. Sides of the plates that contact the product are flat. The others are corrugated, and are welded to the flat sides to form straight passages through which the ammonia refrigerant passes.

Bottom plates in each station are fixed to the main freezer frame, and the top plates are all attached to an outside frame that rests on four hydraulic cylinders. During loading, cylinders are raised to spread the plates apart. When cylinders drop, plates close, and exert about 10 lb. pressure on the product.

Tests have shown that this plate pressure on the product definitely speeds freezing time.

Four screws on the frame permit adjustment of plate clearance for packages ranging from 1¼ to 5½-in. thickness. Uniformity of pressure on the packages—across the width of the plates—is governed by adjustable trusses on each bottom plate that are turned to warp the surfaces.

The entire freezer is located in a cement block room, insulated with 12 in. of cork on the inside wall. The cork is covered with plaster. An insulating air space has been left between freezing-room ceiling and the roof of the plant.

### Unusual Loading Method

Packages are placed in the eight freezer levels by a unique indexing and loading conveyor. This carrier, which pivots around its inlet end, can be raised and lowered (by a hydraulic motor-powered screw) to align with any one of eight ports in the wall of the freezer room.

A counter on the end of the conveyor checks packages as they pass into a freezer level, and stops the belt when 16 have passed. The hydraulic motor then raises conveyor to the next level.

Packages slide through the ports and land on roller-and-chain conveyors that pull them into position in front of the plate sections. These conveyors run continuously. The free-spinning rollers eliminate carton-conveyor friction when packages hit stops at the end of the loading levels.

After the indexing conveyor has filled all eight loading levels from bottom to top, it pauses. Freezing plates are opened by the four hydraulic pistons, and an eight-bar ram propels packages into spaces between the plates.

When plates are once again closed, the index conveyor resumes operation—starting this time from the top and working down.

The loading ram is actuated by two hydraulic pistons, working through L-shaped cranks that multiply piston travel. Ram starts its push rapidly, then slows down as packages reach cartons already in the freezer (to prevent impact damage).

Freezer is always full, because it operates only on demand. Thus, when unfrozen packages enter loading end, they push eight rows of frozen cartons out of the opposite end onto "tailgates". Discharged packages on the bottom tier touch a trip bar as they clear the plates. This stops and reverses ram at the loading end, and tilts the eight tailgate plates. Packages tip into V-shaped pockets, ready for removal from the freezer.

Since there is only a single exit conveyor from the freezer room, packages from all eight levels cannot be discharged from the freezer simultaneously. To stagger the rows and control this situation, a single chain (driven by a hydraulic motor) is threaded through all eight V-shaped troughs. It has two projec-

tions that sweep packages onto guide rails leading to the discharge conveyor.

The projecting arms are so arranged that as one is sweeping a row, the other is on its return leg to another row. Entire discharge normally takes about 4 min., but the sweep-chain has a variable-speed control.

A full-flooded recirculating ammonia system holds the plate temperature at −50 to −55F. Freezing room temperature runs about −30 to −40F. at the floor, somewhat higher at the ceiling.

Surge drum for the system is located on the floor under the loading ram. A pump (50 gpm.) forces ammonia to headers at each plate. Orifices control flow through individual passages. The tilted plates aid flow and prevent accumulation of ammonia bubbles.

The pump circulates about 250 lb. of liquid ammonia per minute through the plates. About 45 lb. per min. is evaporated by the food.

No flexible couplings are used in the ammonia piping. Instead, fluid passes from surge drum to movable plates via eight split coils—designed like a single turn of a helical spring. As plates raise and lower, these coils warp and absorb the movement. Piping to the fixed plates, of course, is standard.

### Air Conditioner Halts Frost

To prevent frost formation in the freezer, a rather unusual air conditioning system has been developed to seal the package entrance ports.

Cold dry air is drawn from the freezer (about 100 cfm.) and passed through the inner tube of a concentric double-tube heat exchanger. Moist room-temperature air (50 cfm.) is blown through the outside tube.

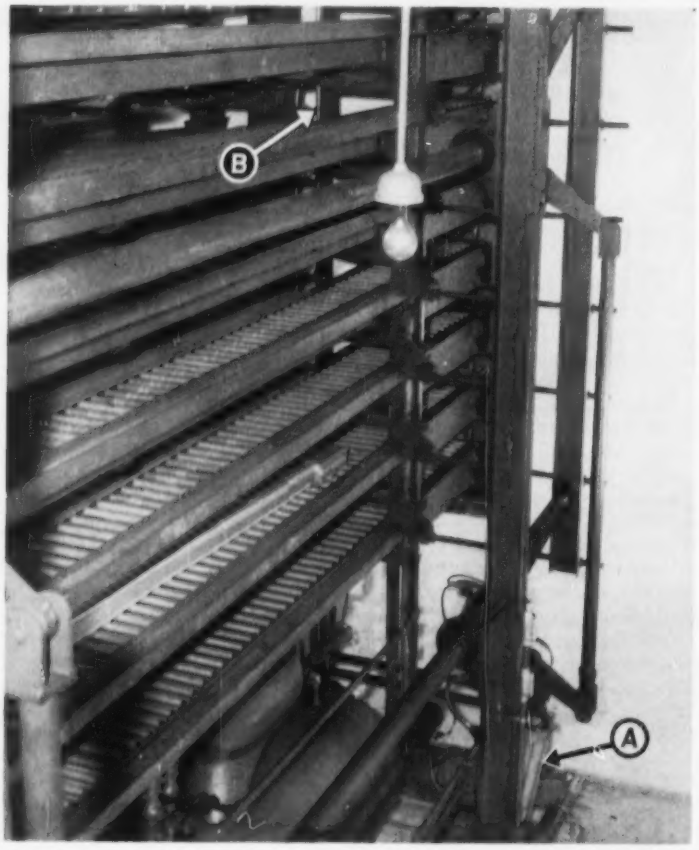
In transit, the room air is chilled to 0F., and its moisture condenses on the tube. This air is pumped into the freezer room as partial make-up for the air withdrawn.

The now-warm, dry air (from the freezer) is further heated to 90F. (by a strip heater in the ducting) and is pumped into a plenum chamber alongside the package ports. It flows into the ports through holes bored in the plenum. About 50% of this air returns to the freezer. The balance blows out into the packaging room—effectively sealing the freezer from moisture-laden room air.

Flow of air in the heat exchanger is automatically reversed at regular intervals to melt frost off the tubes.

With this system, say the makers' engineers, it will be possible to operate the freezer for months without defrosting.

When de-icing does become necessary, the freezer must be unloaded by hand (using the ram, eight wide planks, and numerous small blocks to jack packages out). Hot ammonia gas is pumped through passages in the reverse of normal flow. This blows out accumulated oil and scale.




**INSIDE FREEZING ROOM**, packages come to rest on these roller-and-chain conveyors. Eight rams, actuated by two pistons, as at (A), push ice cream cartons simultaneously between the plates. Safety (B) shuts machine off if held open.

### Interlocked Controls

All controls are electric (Microswitch), and are of the bellows type. They are constructed with silicone-rubber bellows to withstand the low temperature.

Controls on this plate freezer are completely interlocked to prevent jams and malfunctions. Various limit switches at strategic spots shut system down if mechanical equipment fails or packages should happen to jam.

Hydraulic motors are used because they stop immediately when oil is shut off—thus eliminating need for electric brakes. They employ just enough pressure to do the work. Any extra strain stalls them, preventing damage to equipment or to the packages.

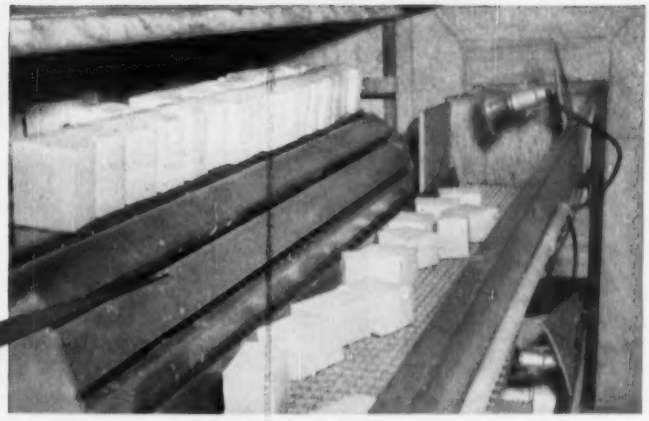
Heat in the oil is removed by an exchanger at the main pump (15 hp.), thus does not constitute a load on the refrigeration system.

Two rotary compressors (100 hp. drives) serve as low-stage system for the freezer. They pass ammonia on to the main reciprocating plant compressors and condensers.

Enough head room has been left over the freezer for the installation of three additional freezing levels, if more production is needed. These would be equipped with their own index belt and ram, and could be set up for another size of product.

# FREEZING at –50°

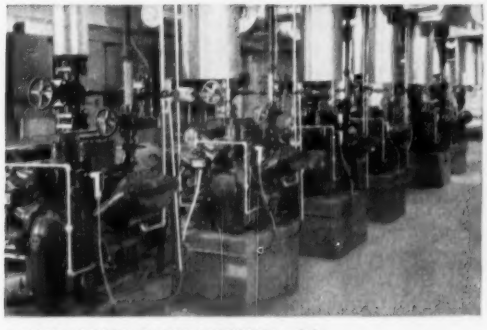
# or STORING at –10°



**ARCADE FARMS COOPERATIVE, INC., Blasdale, N.Y.** In this hardening tunnel, packaged ice cream moves on endless conveyors. Tunnel temperature, minus 50° F. This entire tunnel and much of the plant's other production equipment was engineered by Creamery Package. Shown is discharge end of tunnel.

**RALPH'S GROCERY COMPANY, LOS ANGELES.** In this 86' x 140' freezer room, frozen foods are stored at minus 10° F. "Push-button" operation of the entire refrigeration system reduces supervision to a minimum. Inset shows exterior, compressor room and loading dock.

## Refrigeration Experience, Engineering and Equipment *PAY OFF!*



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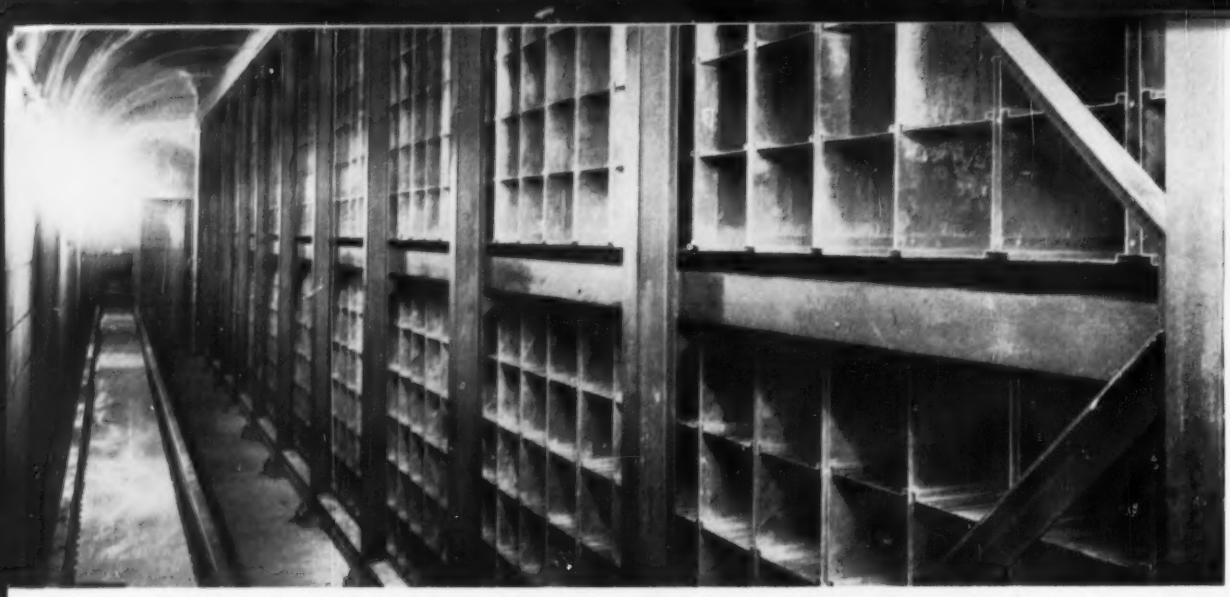


SHELF-TYPE FREEZER employs multiple carriers, pushed through air blast by hydraulic rams. Note formed channels in shelves that hold packages in a straight line, thus promote constant air flow around ice cream. Belt (lower left) carries unloaded frozens to storage. Unit is made by Freezing Equipment Sales, Inc., and installed at Borden Co., Columbus, Ohio.

# Four "Hot" Blast-Freezers

**New designs and improvements in air-blast freezing keep these units top contenders in the race for efficient, top-quality production**

**NOT ALL MANUFACTURERS hold with the view that continuous plate units are the answer to freezing packaged products. Some insist that a properly engineered blast-type machine is practically as efficient—and, they say, is cheaper to install and maintain than the more complex plate freezers.**

## Continuous "Shelf" Freezer

Such an opinion is held by Freezing Equipment Sales, Inc. This company produces a really unique, two-level, automatic blast-freezing unit that incorporates sliding package carriers—"shelves" that are pushed through the freezing section by two, powerful hydraulic rams.

It operates only on demand. Thus, if there are no packages, there is no movement in the freezer. This assumes a full-capacity load and keeps a constant package pattern in the path of the high-velocity air blast at all times—a feature stated to extract maximum benefit from the refrigerated air blast.

Packages are lined up in the carriers on specially grooved shelves. And each package has three sides exposed to the cold air, and one side on a cold shelf. Carriers are packed tightly together in the freezer, and shelves are sized to leave only a small space around each line of packages. Thus, air blast is concentrated in a thin film around product—a further boost for heat exchanging efficiency.

FES's latest unit, a large-capacity model that will harden over 1,400 gal. of ice cream per hour, has just been put into operation at Borden Co., Columbus, Ohio. This freezer is 66 ft. long, 8½ ft. wide, and 10½ ft high. The freezing section is contained in a large insulated room; the loading mechanism in a small, separate room at the front.

Total capacity of the unit is about 6,720 packages. They are contained in 140 aluminum shelf carriers (each carrier has six shelves holding eight 1-gal. packages). And it takes approximately 4 hr. for a carrier to make the circuit—over the top section of the freezer, and back to the loading station on the bottom half.

### New Loading Device

Prime feature of this installation is an improved loading mechanism that positively governs package feed, and is said to entirely eliminate crushed cartons. Here's how it works:

Packages enter loader via a short conveyor belt that feeds them onto a second, longer belt running the full length of the loader. When packages reach front of the unit, they are halted by stops on two chain conveyors, located on either side of the belt.

Two limit switches control package movement. The first counts packages as they pass. Eight packages normally constitute a load for a single shelf. After these have been counted, a positive gate-type stop drops on the long feed conveyor to hold back further packages.

If the line of packages is too long for the shelf, the second switch shuts down all machinery until excess packages are removed.

When a carrier reaches loading position on an elevator at the front of the freezer, a hydraulic ram under the loading table slides through carrier's top shelf and unloads previously frozen packages. After it retracts, the

elevator raises the carrier one shelf. As ram unloads the second shelf, the chain feed conveyors start and rotate half a revolution. This forces the eight packages on the feed belt into the first freezer shelf.

The belt on which packages rest is kept running continuously. This helps bring packages quickly to loading speeds and avoids any shock when chain conveyors accelerate.

When all six shelves on the carrier are loaded, the elevator raises the unit and places it on a slide track. No wheels are employed in this freezer. Carriers are built on heavy aluminum channels, fitted with stainless-steel shoes that slide along a Nylon wearing strip.

A powerful hydraulic ram pushes the loaded shelf-carrier into the freezer, and advances all carriers.

At the rear of the freezer, the last shelf is forced out onto a second elevator. Both front and rear elevators then lower to the bottom track, and a second hydraulic ram, at rear of freezer, pushes all carriers toward the front of the freezer. This, naturally, ejects a shelf-carrier onto the front loading elevator, and operations are repeated.

Several engineering factors had to be solved for perfect operation of this system.

The length of the freezer magnifies expansion and contraction of the frame under temperature fluctuations. And the shelf-carriers, with even careful fabrication, vary slightly in dimensions. Therefore, to insure exact positioning of carriers on the elevators, two small hydraulic pistons are installed at each elevator. And after carriers have been pushed onto elevators by the main hydraulic rams, these small pistons hook onto the shelves, spotting them perfectly.

Three sets of spiral-fin coils (York) serve as heat exchangers for the freezing air blast. Twelve fans (5 hp. De Bothezat units, four on each coil) circulate the cold air through the top section of the freezer, then back through the bottom section to the coils at 1,000 to 1,200 fpm.

### Refrigeration and Controls

Ammonia refrigerant is employed in a liquid recirculation system. The cold fluid is pumped from surge drum to coils and back to surge drum. Vapors are drawn off top of surge drum to compressor suction. The freezer takes about 60 tons of refrigeration to maintain air blast temperature at −25 to −30F.

Heart of the control system is a mechanical ratchet device, mounted on the top front of the freezer framework. It advances, one notch at a time, under pressure of a hydraulic cylinder, and raises the loading elevator by cables to index shelf carrier.

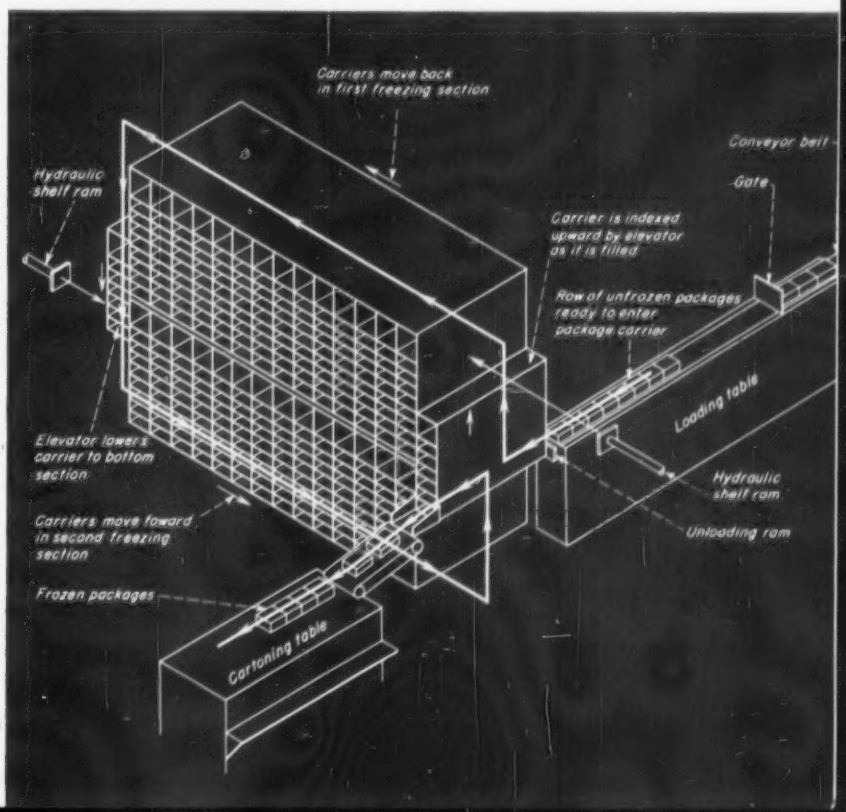
Limit switches are spaced along this ratchet to electrically control all other functions of the freezer—such as the carrier rams, rear elevator, unloading ram, and loading table conveyors.

These limit switches tie-in to a central control panel located under the loading table. On the front of this unit is a diagram of the freezer setup, with lights that depict action of important components in the freezer. Relays and the timing mechanism are located inside box.

While the entire system normally runs under automatic control, a series of pushbuttons permits manual operation of any section. But even in this circumstance, the operator cannot go wrong. For automatic safeguards prevent him from making any move that would jam the machine.

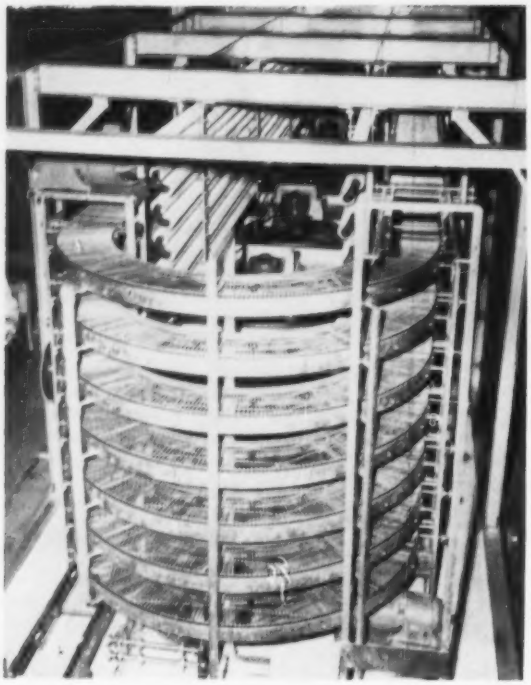
Relays are a special type that are held closed by self-induced currents. So even a power failure will not disrupt operating sequence.

All hydraulic power is furnished by a single, 15 hp., variable-output pump (Racine Hydraulics & Mach'y., Inc.). Carrier rams take 500 lb. of hydraulic pressure for operation; other rams only 300 lb. Accordingly, the vane-type pump contains a governor that automatically adjusts pump liner for the pressure required at any particular stage of action.


Carriers move back in first freezing section
Conveyor belt
Gate
Hydraulic shelf ram
Carrier is indexed upward by elevator as it is filled
Row of unfrozen packages ready to enter package carrier
Loading table
Elevator lowers carrier to bottom section
Hydraulic shelf ram
Carriers move foward in second freezing section
Unloading ram
Frozen packages
Cartoning table

**OPERATION CYCLE** of FES continuous shelf freezer is shown in this schematic. The aluminum shelves slide on stainless steel shoes, pushed by powerful hydraulic rams (located front and rear). Ram under loading table pushes all the way through shelf to discharge frozen packages. Loading of unfrozen cartons is accomplished with a belt and two chain conveyors that whip cartons into shelves at high speed. Positive-acting gate on loader prevents any extra package from slipping into line during loading.

## Unit and It's Performance



SPIRAL-CONVEYOR FREEZER has refrigeration coils and fans located in the center of the belt unit. Machine (York Corp.) is enclosed in an insulated box.

| Product | Production Rate (per hr.) | Dimensions (Ft.) L | W | H | Tons Refrigeration |
|---|---|---|---|---|---|
| BREAD & ROLLS | | | | | |
| Bread 1 lb. Loaf Sliced & wrapped | 8,000 | 119 | x15 | x12 | 87.4 |
| Bread 1 lb. loaf Sliced & wrapped | 3,500 | 54 | x15 | x12 | 41.9 |
| Rolls (pkg. of 6) | 2,800 | 46 | x15 | x12 | 31.7 |
| FRUIT PIES | | | | | |
| 8" dia. (32-oz. unboxed) | 1,600 | 70 | x15 | x 7 | 51.7 |
| 8" dia. (24-oz. unboxed) | 3,000 | 63 | x15 | x11 | 68.9 |
| MEAT PIES | | | | | |
| 5" dia. (8-oz. unboxed) | 7,200 | 54 | x15 | x10 | 49 |
| 5" dia. (8-oz. unboxed) | 30,000 | 82 | x15 | x18 | 213 |
| ICE CREAM | | | | | |
| Gallon-wrap (2-qt. & pts.) | 1,200 gal. | 41 | x15 | x12 | 37.9 |
| Individual (2-qts., pts., etc.) | 1,500 gal. (3,000 2-qt.) (12,000 pts.) | 50 | x15 | x12 | 46.2 |
| WHOLE TURKEYS | | | | | |
| 15 lb. birds (in Cryovac Bag) | 550 | 115 | x15 | x16 | 84.4 |
| WHOLE CHICKENS | | | | | |
| 4½ lb. birds (in Cryovac Bag) | 450 | 38 | x12 | x10 | 17.8 |
| MEAT & FISH | | | | | |
| 1-lb. pkgs. hamburger | 2,600 | 55 | x11 | x10 | 33.8 |
| 4-oz. individual meat patties (unwrapped) | 24,000 | 50 | x15 | x10 | 70.0 |
| 10-oz. barbecued meat in sauce | 4,800 | 44 | x15 | x12 | 31.4 |
| 1-lb. pkgs. beef stew | 6,600 | 92 | x15 | x12 | 114.5 |
| Loose fish sticks | 25,600 | 66 | x10 | x12 | 36.3 |
| 12-oz. pkgs. chow mein | 4,800 | 52 | x15 | x10 | 60.1 |

# Spiral Belt Freezer

Great interest has recently developed in freezing bakery products—to even out production schedules for specialty goods and to eliminate much of the pemium pay for overtime, holiday, and night work.

To this end, a special type of blast freezer has been brought out by York Corp. and Union Steel Products Co. It consists of a compact spiral conveyor that winds around fans and refrigerating coils. Designed to take baked goods of all shapes and sizes, its been expanded from the original concept to handle such diverse items as fruit and meat pies, ice cream, whole poultry, meats, fish, and packaged specialty products (see chart for facts on different foods).

Originally, the design principles were formulated with bread freezing in mind, and these known facts:

1. Air velocity has little effect on freezing time of wrapped, sliced bread.

2. Bread must be reduced to 20F. or below as rapidly as possible to minimize firming.

3. Air temperature is a major factor in cutting freezing time.

Tests disclosed that the core of a bread loaf reaches a plateau on the freezing curve at about 20F. and will remain at that temperature for about 30 min. before going lower. For this reason it is practical economics to remove the loaf from the freezer at this point and place it in holding storage at 0F.

Specialty baked goods, on the other hand, generally freeze faster than bread, because they are less bulky and have a greater percentage of surface exposed to the blast. They pass the 20F. freezing point with no plateau, thus it is economical to pull them down to about 15F. before transferring to storage.

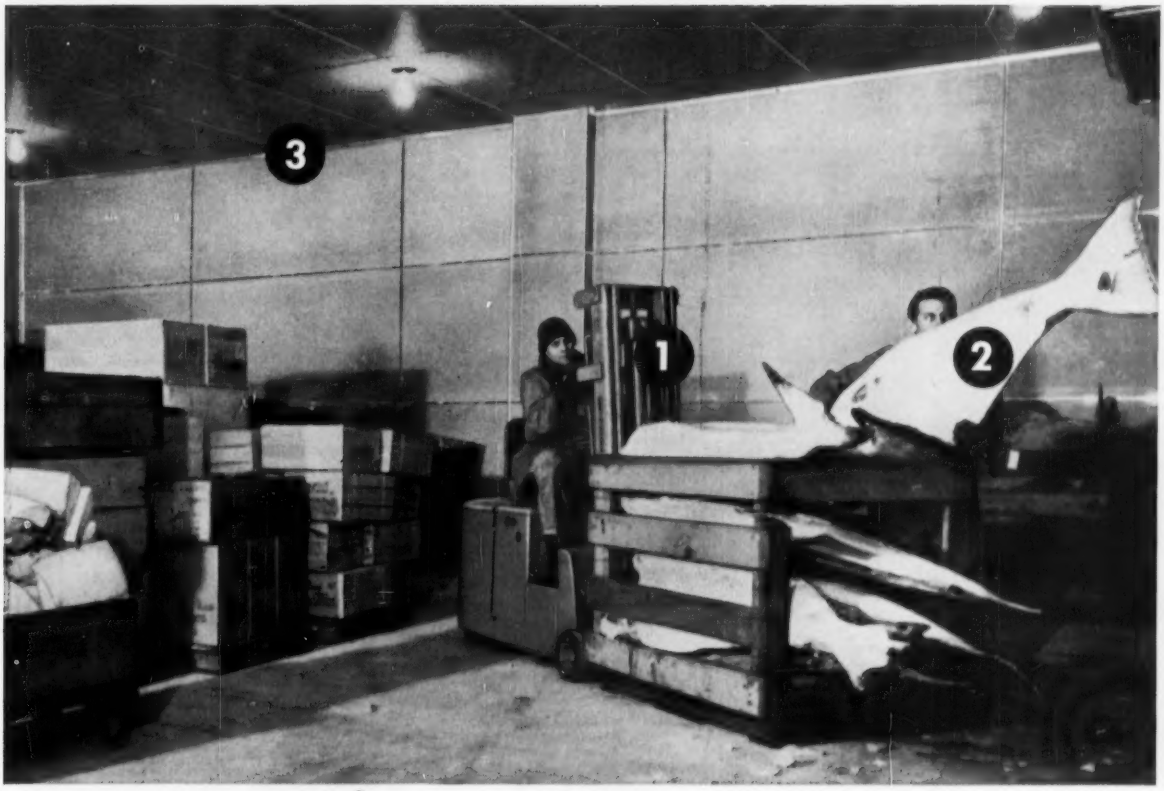
It has been found very necessary to package these specialty items before freezing to prevent deterioration of icings and sugar coatings. Unwrapped goods permit condensation of moisture on their surface during the first freezing stage. This "melts" icings and sugars into a syrup.

One of the most interesting applications of the York-Union freezer is not on bread, however, but fruit pies. Here, 900 ft. of straight-wire conveyor (24 in. wide) is arranged in eight tiers (spaced 8 in. apart). It is enclosed in an insulated box measuring 61 ft. long, 15 ft. wide, and 10 ft. high.

Pies are of 8 in. dia. and 1¼ in. deep. Production is 2,400 pies per hr. They enter freezer though a frost-free top port at 70F. and leave 1½ hr. later at 15F. (core temperature).

Total refrigeration load is 60.2 tons, and effective freezing tonnage is 49.9. Spiral fin coils (5,500 linear feet) are arranged in two vertical banks inside the conveyor. Propeller-type fans are located in the center, between the coil banks, and consist of 15, 4-bladed units of 28-in. dia. and 1½ hp.

Ammonia is used as the refrigerant in a liquid recirculation system (York makes a Freon system, too). A compound compression system is employed to provide the low evaporator temperature of —40F. (air blast temperature is —30F.). A rotary compressor (100 hp.) serves as the low stage, with a V/W type reciprocating compressor (75 hp.) as the high side.




# LOOK!... 3 good reasons why your cold-room walls need J-M Asbestocite

This typical cold storage scene at the Long Beach (California) Seafoods Company helps explain the trend to Asbestocite® sheets as a protective finish over refrigeration insulation.

**Take the liftruck, for example—**

It symbolizes the kind of rough service for which Asbestocite is designed. This doesn't mean that liftrucks should be smashed into Asbestocite walls. But short of this, you'll find Asbestocite will withstand literally decades of hard usage.

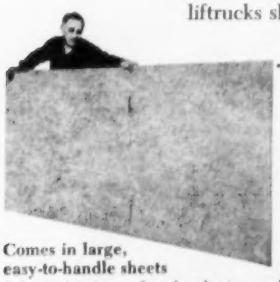
**... and the fish—**

This is one of many foods that give off strong or offensive odors. Here Asbestocite really pays off! It won't pick up odors to contaminate delicate foodstuffs. And it cleans quickly, easily with ordinary soap and water.

**... and the wall appearance—**

Neat, attractive walls of Asbestocite encourage cleanliness, pass the most critical inspection. Asbestocite never needs protective coatings—simply will not rot, corrode or burn.

For further information, write to Johns-Manville, Box 14, New York 16, N.Y.



**Comes in large, easy-to-handle sheets**

Asbestocite is made of asbestos and cement formed under high pressure. It is attractive, natural gray in color and has a hard, smooth finish on one side. Available in sheet sizes up to 4'x12' ... in thickness up to ½".

## *Short Specifications for typical cold-room wall*

**Insulated Cold Room Finish.** Shall be $\frac{3}{16}$" thick Johns-Manville Asbestocite secured to treated wood nailers with wood screws or to T-bars by means of clips as the case may be.

**Refrigeration Insulation.** Shall be Johns-Manville Rock Cork sheets —" thick, installed in two layers using Rock Cork asphalt or other approved adhesive. The second layer shall break all joints with the first.

**Johns-Manville Rock Cork refrigeration insulation has been the choice of refrigeration engineers everywhere for over half a century. It offers these advantages: High moisture resistance—sanitary, odorless service—low conductivity—long service life—top structural strength.**

**Johns-Manville *first-in* INSULATION**

**MATERIALS · ENGINEERING · APPLICATION**

# NOW . . . A new and better way to freeze fish, meats and vegetables with . . .

## the GREER CONTINUOUS MULTI-TIER FREEZER having features no other freezing system can match

### RESEARCH AND ENGINEERING SERVICES

Greer has the Equipment, Personnel and complete facilities for the analyzation and accurate determination of your product processing requirements—radiant cooking, cooling and freezing.

Why not take advantage of these unique services?

### MAKES FREEZING A SIMPLE, CONTINUOUS PROCESS

A series of moving trays carry products through freezing cycle continuously, automatically. Increases man-hour output.

### FASTER, MORE UNIFORM FREEZING, TOO

Continuous motion plus open-tray construction insures positive air circulation—exposes products in each tray to absolutely uniform, controlled conditions.

### A COMPLETE, PACKAGED FREEZING PROCESS . . .

Engineered to your production requirements and building facilities. Complete refrigeration systems included.

***TESTED . . . PROVEN***

*Write for informative Bulletin #55-122*

*Actual installations prove GREER freezers make freezing fast, economical. Save space, boost quality control.*

# J. W. GREER COMPANY

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***Sales Engineering Offices: Chicago, Ill., San Francisco, Calif.***



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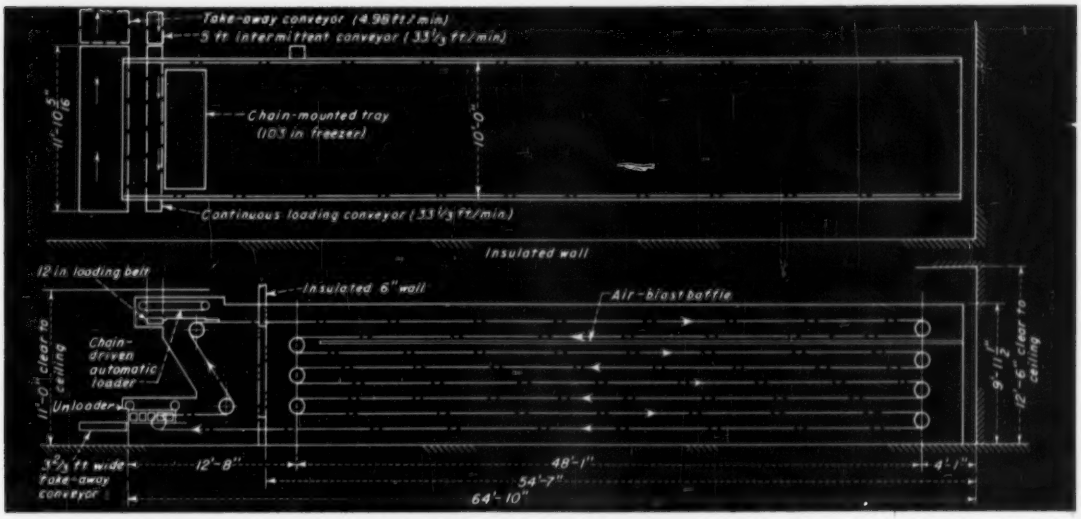



**BELT-AND-BLAST** unit uses 103 trays and 400 ft. of active travel (spread over eight levels) to harden 1,200 gal. of ice cream in a 4-hr. cycle. Separate anteroom at front of unit houses loading and unloading mechanism. Baffle under seventh tier directs air flow from refrigerated coils over top trays and back through bottom carriers.

## Conveyorized-Tray Freezing

A further example of efficient air-blast freezing is a multi-level continuous tray freezer. Made by J. W. Greer Co., Wilmington, Mass., this device—which has already been adopted for freezing loose fish sticks and for hardening ice cream—is of simple construction.

It consists of either solid or mesh trays, connected by pivots to two chain conveyors that wind back and forth over several levels in the path of a chilled air current.

A prime example of its application is the installation at Borden Co., Woburn, Mass. Here, an 8-level unit, designed to harden 1,200 gph. of ice cream on a 4-hr. cycle, has actually hit speeds of 1,400 gph. on a 3½-hr. cycle.

The freezer will hold 4,800 gal. of ice cream with all trays full (five rows of ten 1-gal. packages per tray).

The bundled cartons (eight pints, four pints, two half-gallons, or a bag full of Dixie cups) are loaded on the top freezer tier in a special anteroom at the front of the freezer, held at 0 to 10F. A timer on a short feed belt allows ten packages to pass onto a loading belt, located directly in front of the trays. Then, feed belt stops, and a chain-driven sweep shoves cartons onto the mesh freezing trays.

The trays run continuously at a speed of 20 in. per min.

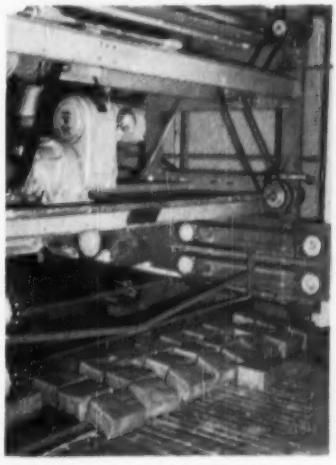
When packages have traversed the eight levels, they emerge again into the anteroom at the bottom level. Here, a timed sweep discharges them onto a transverse conveyor that carries them to a storage area.

Pressure switches on the two sweeps act as safeties, shutting down the machine in the event of jams. All mechanical operations are driven by a single, 3-hp. vari-speed gearhead motor.

Entire freezer and anteroom is enclosed in a cement block room, this being insulated with 8 in. of cork. The wall between tunnel and anteroom is insulated with cork.

Air blast is provided by ten axial, disk-type fans (5 hp., de Bothezat units) that turn out 120,000 cfm. By means of a baffle, placed under the seventh tier, this air blast is forced through the top two tiers in a concentrated stream, then it returns to the freezing coils through the bottom six tiers of the unit.

Total refrigeration tonnage is about 96 tons, of which 65 tons is effectively applied in maintaining air blast at –25 to –30F. A pump-flooded ammonia system is used. Liquid ammonia (–35F.) is forced from the receiver in the anteroom through three banks of fin-type coils.



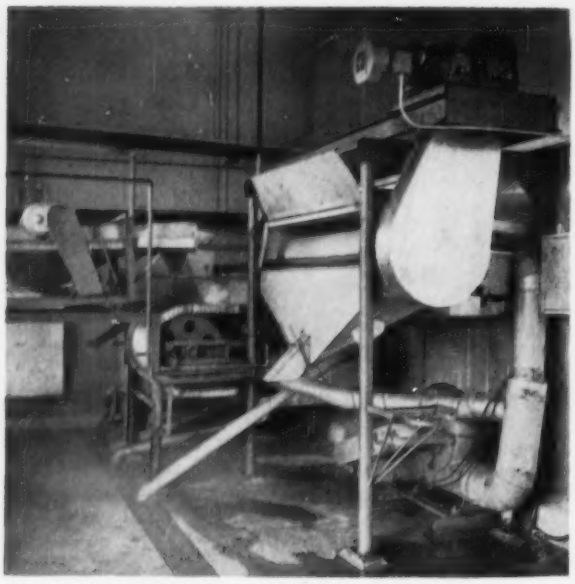
**CLOSEUP IN ANTEROOM** shows chain-driven unloader sweeping packages onto take-away belt. Gearhead motor (center) drives all mechanisms.

## Three-Stage Belt Tunnel

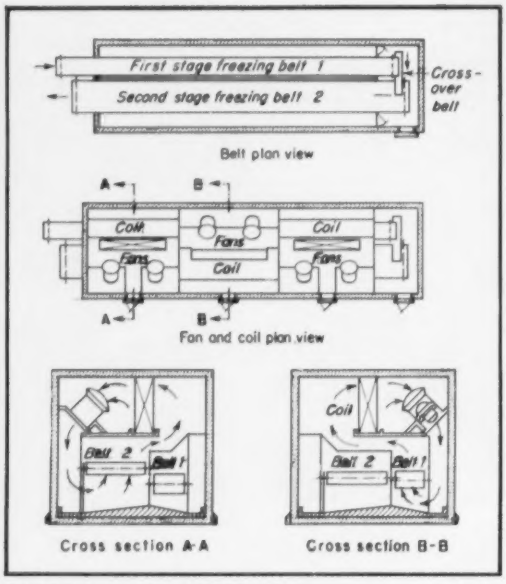
Lately, considerable promotion has been put behind the marketing of vegetables and fruits in loose-frozen form—so that the housewife can pour out just what she needs, and so not be forced to use the whole package.

Also, many packers have turned to this loose-freezing system to even out production schedules—repacking the bulk product in consumer sized packages during the winter slack period.

For this type of freezing, a belt-type blast tunnel is considered perfect. And these old standbys have been greatly improved in efficiency through proper design and applica-



**FEED AND DISCHARGE END** of efficient new belt-type blast tunnel. Shaker (left) dewaters product before freezing. Discharge hopper (right) holds frozen peas or corn. Blower (bottom right) dries steam-deiced freezing belt.




**PRODUCT AND AIR-BLAST** movements are clearly shown on these plan and cross-section views of Freezing Equipment Sales' three-section unit installed at Nittany Packing Co., Center Hall, Pa.

tion of latest freezing principles.

A good example of this trend is the installation at Nittany Packing Co., Centre Hall, Pa. (Div. of Hanover Canning Co., Hanover, Pa.). At this plant, U-shaped belt unit whisks product through the freezing section in 12 min. flat—and can handle corn at 4,000 lb./hr., and peas at 5,000 lb./hr.

Specially interesting is a pressure-vac device, used to remove excess water from the vegetables, and thus reduce the amount of cluster-breaking necessary after product is frozen.

#### Efficient Freezer Design

In operation, blanched products are flumed to the freezer building and dewatered. Corn and peas are then dumped into a special, 150-ft. chilled water flume (36F.) that cuts product temperature to 40 deg. Installation of this pre-chilling step jumps freezer capacity about 15%.

After dewatering on a shaker screen, vegetables drop onto the first stainless-steel mesh freezer belt and are further dried by alternate air blasts and vacuum from pipes located under belt (see drawing).

At the end of the first belt, a doctor knife separates product from the mesh and transfers it to a cross conveyor. A spring-loaded cluster-buster gently breaks up any product clumps, then vegetables drop onto the second freezer belt and return through the air blast. Product finally falls into a hopper and is manually boxed in 55-lb. cartons.

By use of insulated sheet metal baffles and separate blower-and-coil units, the freezer is divided into three sections for top efficiency.

On the first freezing belt (3 ft. wide), product is subjected to a 0F. blast that glazes it and prevents excessive weight losses from dehydration. This belt travels at the rate of 8-10 fpm.

Returning on the second freezing belt (6 ft. wide), vegetables are sharply frozen by a two-part system. First section is at −10F., while the last air blast is at −20F. Product leaves freezer at −10 to −15 deg.

Each of the freezing belts contain about 60 linear ft. of effective freezing area. The short cross-over belt is constructed of aluminum and is held into place in the freezer by only one bolt. This permits quick removal for cleaning.

The box surrounding the freezer is constructed of marine plywood, sheeted on the outside with aluminum and treated inside with a water-resistant varnish. Dimensions are 62x13x14 ft. Glass fiber insulation is used, ranging from 8 to 8½-in. thickness.

Floor is constructed with a 10 in. base, two 4-in. layers of glass fiber insulation, and a cement covering that is triangular in cross section.

Through the artfully arranged baffles, blowers circulate air blast down to the floor, up through the product, and back to the coils.

Each freezing section located over the product belts contains two axial flow fans (10 hp.) and a heavy duty spiral-fin coil assembly, measuring 2 ft. thick, 5 ft. high, and 16 ft. long. The center section serves the first stage freezing belt. The end compartments supply the second stage belt.

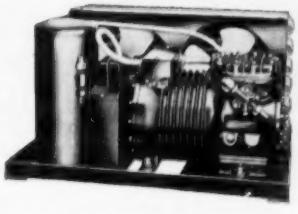
A hot-gas defrost system is used, and sections can be defrosted independently of each other. To minimize frosting on the belts, a steam and water jet is set up on the return side of each belt just before it goes into the freezer. This is followed by a blower (10 hp., 3400 rpm.) to dry the belts.

Refrigeration needs are supplied by a two-stage system, comprising a rotary booster (Fuller, 75 hp.) and a big 10x10 reciprocating compressor (York, 100 hp.).

System holds 3,000 lb. of ammonia, which can be pumped down into a 2-ton holding tank located under the condensers.

To prevent the freezer floor from heaving warm kerosene (50-60F.) is pumped through pipes laid in the concrete. The oil is heated in a 1,500-gal. supply tank by hot cooling water from the compressors.

# getting there is only half the job!



**CAPACITY**

Choose from ⅓ to 3 H.P. in Copelametic, the direct-drive accessible hermetic, and economical belt-driven models. Model TR-100 shown.

**DEPENDABILITY**

Thousands of Copeland units now in use have given years of trouble-free, over-the-road service—proof of superior engineering, ruggedness and dependability.

**AVAILABILITY**

Our unexcelled coast-to-coast network of 130 wholesalers and over 25,000 refrigeration dealers means the best in service when you need it. It's only a phone call away.

## Copeland refrigeration does the rest . . . keeps food fresh!

The old-fashioned dairy maid got there all right . . . but her milk and butter wouldn't satisfy *modern* demands for down-on-the-farm freshness and flavor. Today, truck fleets equipped with dependable Copeland units protect in-transit payloads from spoilage and flavor loss.

Whatever the application—holdover or over-the-road—a Copeland unit meets the critical needs of multi-stop deliveries and long distance hauling. Plugged in at stops, or run from a generator for over-the-road use, a Copeland unit produces cooling you can count on all the way . . . at lowest cost per mile.

SINCE 1918

**Copeland** REFRIGERATION CORPORATION, Sidney, Ohio

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# Direct-Immersion Freezing

**Three models are available—one of them brand new. Offer high heat-exchanging efficiency for a limited range of products**

**GREATER ATTENTION should now be paid to the possibilities offered by immersion freezing.**

**Besides offering top efficiency, by getting packaged or unpackaged product right into the heat exchange medium, they also lend themselves to simpler construction than other types.**

**There is nothing extremely new about the idea. Fish have been frozen in chilled brine for a number of years. FMC Corp. has, for some time, had a rotary unit on the market that uses various alcohols as the heat-transfer medium. Barry-Wehmiller likewise uses alcohol in an ingenious adaptation of the walking-beam conveyor.**

**Latest entry in the field is a tank-type liquid freezer (Kent Industries, Chicago) that uses jets of sub-zero propylene glycol to quick-freeze poultry (see photo below).**

## Rotary Can Freezer

The continuous freezer made by Food Machinery & Chemical Corp. is an adaptation of FMC's highly successful rotary cooker. In fact, the freezer uses many of the same components, such as feed-in and discharge valves.

It will handle only a narrow range of canned products in No. 202 containers (ranging in length from 2 14/16 to 3 14/16 in.) at speeds to 300 per min. The unit holds up to 4,500 cans.

Containers enter the machine through a rotary turret that indexes them on a spiral reel. This latter device has a liquid-tight center that gives buoyancy to the cylinder and lowers the amount of refrigerating liquid necessary. The balance between buoyancy and operating weight results in reduced strain on the end bearings. And the turbulent, thin film of secondary refrigerant promotes high heat-exchange efficiency.

Cans travel along the spiral reel—completely submerged in cold fluid—and are removed at the end by another turret valve.

The secondary refrigerating medium (an alcohol) enters freezer at about 800 gpm. through a central manifold. It travels both ways and leaves the freezer at the ends, passing first to a storage tank, then to a tubular heat exchanger where it is chilled by the primary ammonia refrigerant.

High velocity of the alcohol and rotary action of the containers greatly speed freezing. A can of orange juice concentrate will drop from 40F. to 0 deg. in 10 to 15 min. In this example, 70 tons of refrigeration handle the load. Another example of this freezer in action is seen at Campbell Soup Co., Camden, N. J.

Here, two units are coupled in series to double the distance cans travel through the refrigerant. Alcohol refrigerant is pumped through freezers at the rate of 1,800 gpm. So rapid is the heat transfer that cans of soup are dropped from 190F. to freezing in less than 30 min.

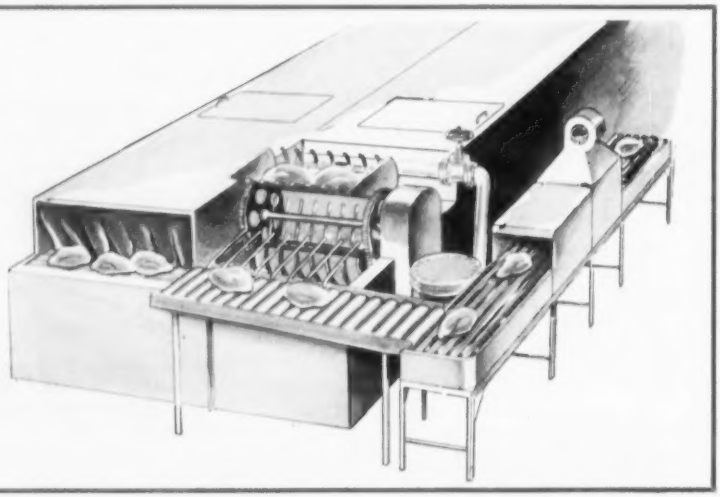
A large, horizontal shell-and-tube heat exchanger (York, 300-ton capacity) is used in this installation to chill the 7,000 gal. of alcohol needed to fill the system.

Loss of alcohol has been a considerable problem in this unit. And though FMC has no device for recovering alcohol that leaves the freezer on the surface of the cans, processors using the machine have generally adapted a brush-type can cleaner to help cut these losses.

Liquids used as secondary heat exchanging media for this freezer are coolants such as Zinol 150, denatured ethyl alcohol, and a mixture of 75% isopropanol and 25% acetone.

**Brand New . . .**

. . . immersion freezer propels packaged poultry through a chilled bath of propylene glycol. Unit handles about 5,000 lb. of turkey per hour. Jets of alcohol are used to convey the floating birds through freezer. Spoked unloader and drain trough (center) help drain excess alcohol from product, which is finally washed in hooded sprayer (right).



## Tubular Immersion Freezer

Another method of freezing canned foods—and even glass-packed products—was developed in the late 30's, and installed in several West Coast plants.

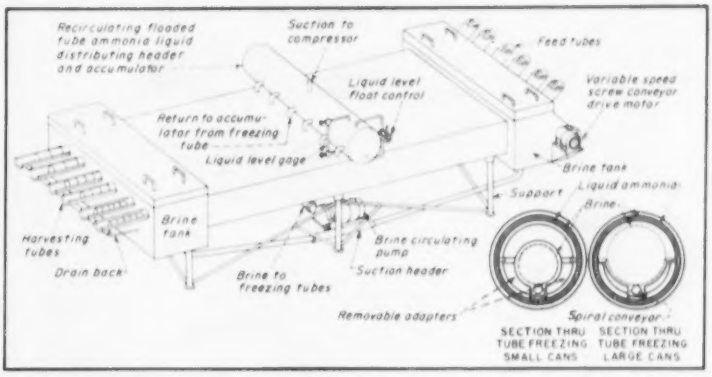
The technique (W. J. Finnegan Co., Los Angeles) employs primary and secondary refrigerants, kept in close contact by three concentric tubes. Cans or jars are forced through the central tube by means of a spiral screw (see diagram).

Primary refrigerant is ammonia and it is passed through the annular space between the second and third concentric tubes in a full-flooded liquid recirculating system.

The secondary refrigerant—a mixture of alcohol and water with a freezing point of –42F.—is pumped through the annual spaces between the first and second tubes, and also around the product containers in the third tube. Liquid ammonia holds temperature of this refrigerant at –25F.

High velocity and turbulence of both refrigerants, and rotary action of the cans passing through the unit, promote fast freezing. And a machine containing six of the tubular units can handle 2,500 lb./hr. of liquid or semi-liquid product.

Furthermore, when freezing glass-packed items—a practice tried during World War II to conserve tin—rotary action makes for a better-looking product. For the air space freezes into a core in the exact center of the container, thus making the jar appear filled to the brim. This could be of considerable importance in the event plastic containers gain a strong foothold in food freezing.




**UNIQUE TUBULAR CAN FREEZER** 'spirals' cans through a cold, alcohol-and-water-filled tube. Liquid ammonia, circulating around tube, chills brine. Inserts adapt machine for large or small containers.

# Continuous Liquid Freezers

**Fast heat exchange has enabled the four machines detailed here to virtually monopolize the liquid- and semi-liquid-product freezing field**

**RAPID STRIDES have been made in the development of liquid and semi-liquid freezing units—such as are used for slush-freezing ice cream and orange juice, and for chilling and plasticizing margarine.**

**However, because of the inherent design of these units, products frozen in them must retain some plasticity to be ejected. Therefore, further hardening freezers are necessary. This extra handling robs these continuous machines of some of their natural advantage.**

**Nevertheless, an increasing percentage of ice cream is frozen in these units because of their fast action. So much, in fact, that Cherry-Burrell finally stopped making the old-type batch freezers in 1956. Further, continuous freezers are now used to a considerable extent in manufacture of concentrated orange juice, margarine, and other products.**

## Rotary Liquid Freezer

One freezer that stems from the original Vogt patents (now expired) is the Votator (Girdler Co., Louisville, Ky.). It is used not only for freezing and chilling, but also for cooking and sterilizing a very wide range of foods.

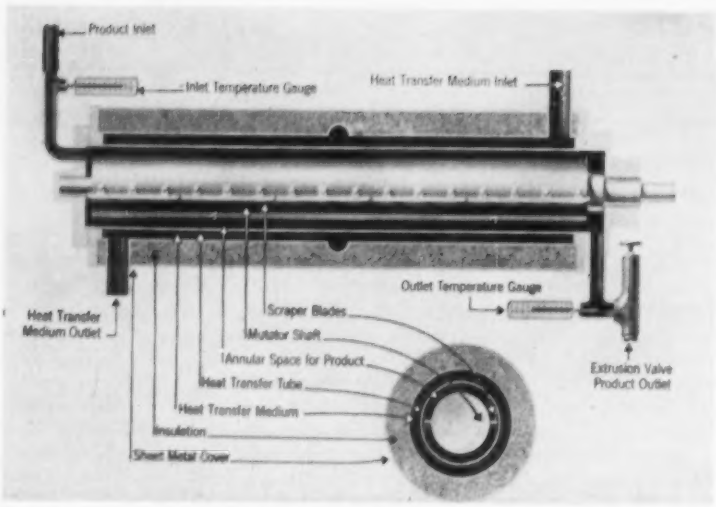
It consists primarily of two concentric tubes, with a solid, rotary mutator, equipped with scrapers, in the inner tube. Speed of the mutator, also scraper design, vary with the product characteristics.

Product flows through the annular space between the mutator and the inner tube wall. This space is kept very small to boost the rate of heat transfer. The scrapers prevent product build-up on tube wall—the heat exchanging surface—and promote agitation of the product to speed freezing.

Refrigerant—or heating medium—passes through the annular space between the inner and outer tubes. The whole device is covered with an insulated jacket. A pump and throttling valve control rate at which product passes through the machine, thus governing the degree of freezing.

This unit varies: From freezers having 0.7 sq. ft. of heat transfer surface up to a giant machine with 60 sq. ft. of surface. It also ranges from capacities of 100 lb. per hr. to outputs of over 30,000 lb. per hr.

A typical unit is one used for slush-freezing (7 to 8% ice) 42-Brix orange concentrate. It contains 18




sq. ft. of heat exchange surface and handles 3,500 lb. of product per hour.

The orange concentrate enters freezer at 42F. and leaves at 16 deg.—a load of 146,500 Btu. per hr. (12.2 tons).

Ammonia at OF. evaporator temperature is used as the refrigerant. Overall heat transfer coefficient is 300.

**SCRAPER-EQUIPPED** mutator keeps the product from building up on heat-transfer surface in this rotary, liquid freezer (made by Girdler Corp.). Full-flooded ammonia system and adjustable extrusion valve govern freezing.

## Revamped Ice Cream Unit

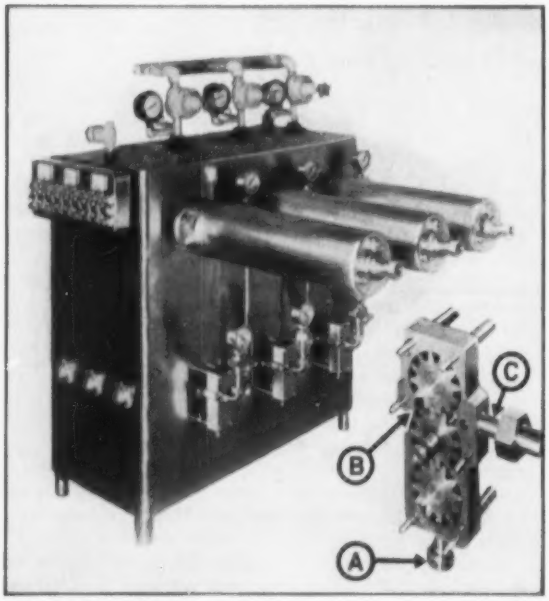
Stemming from the original Vogt patents is another freezer made by Cherry-Burrell Corp., Chicago. It has long been used for ice cream—and is now available for many other food products. Operation of the standard C-B machines is very similar to that of the Votator.

But a new freezer, recently unveiled at the Dairy Show in Atlantic City, shows a radical departure in design and refrigeration application. Initial installation of this unit is at Detroit Creamery.

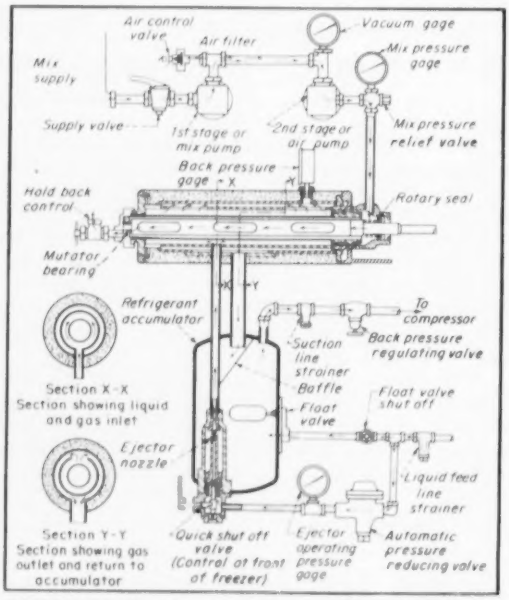
Termed the "Neapolitan", this latest machine combines three independent freezing systems in one cabinet, and is adaptable for either production of straight ice creams or three-flavor novelties and specialties.

Each freezing cylinder is complete in itself, and includes a heat transfer system, removable freezing tube, mutator, and vari-speed drive (5 hp). Capacity of all three tubes is 150 gph. of mix (300 gal. of ice cream at 100% overrun).

A single, new pump on each cylinder, driven by a variable-speed ¾-hp. motor, supplies the mix and air,




**LATEST THREE-BARREL** ice cream freezer employs self-contained components, ammonia-spray refrigeration, and a new triple-gear pump (inset). In pump, mix enters at (A), air at (B). Discharge to freezer is at (C).




**STANDARD** liquid product freezer (Cherry-Burrell) has full-flooded liquid ammonia system. One-third of refrigerant flow goes through ejector nozzle and acts as a pump. Solid mutator keeps product in a thin film.

and replaces two pumps on previous models. It contains three positive displacement gears, capable of delivering two parts of air by volume for each part of mix.

The refrigeration system has been changed from the full-flooded arrangement in the standard C-B freezers to a jet-type spray system that permits freezing action to be instantly stopped at the end of a run.

Here, a separate accumulator is installed on each tube. Level is controlled by float valve. An injector sprays liquid refrigerant through holes under the freezing tube onto the heat transfer surface. Saturated gas returns to the accumulator through a line above the freezing tube. Liquid droplets are removed, and gas returns to the compressor.

Heat transfer figures have not yet been calculated for the new 3-barrel freezer, but are believed to be the same as these for the standard Model V300 freezer:

| | |
|---|---|
| Amt. mix per hr. (150 gal.) | 1,365 lb. |
| Water to ice per hr. | 431.6 lb. |
| Sensible heat | 19,656 Btu. |
| Latent heat | 62,151 Btu. |
| Mech. Equiv. (full load) | 32,449 Btu. |
| Radiation loss | 571 Btu. |
| Total Btu.'s per hr. | 114,827, or |
| Btu.'s per gal. of ice cream | 400 |

It's thus evident that 9.6 tons of refrigeration are necessary for both the 3-barrel freezer and the Model V300 at an ammonia temperature of −17F. and 5 lb. pressure.

## New General-Product Unit

A brand-new rotary heat exchanger, designed for general food service, has just been announced by Creamery Package Mfg. Co. It is available in a standard length, and can be used singly or in multiples up to four. As a freezer, however, it is limited to two cylinders, and chilled with either ammonia or Freon.

A full-flooded direct-expansion refrigeration system is built-in, with a quick-dump valve to drop refrigerant into the accumulator and stop freezing quickly.

Because of the wide difference in food products, the unit is largely custom engineered for each application. Sanitary centrifugal or rotary pumps are recommended for most applications, and the mutator can be of either square or round design.

### New Split-Mutator Freezer

Two other continuous liquid freezers are made by Creamery Package Mfg. Co, Chicago. A standard ice cream freezer, which may be compared with C-B's standard unit, comprises a single cylinder with an open mutator and a flooded-ammonia refrigeration system.

At the recent Dairy Show, however, Creamery Package showed a new twin-barrel freezer with unusually high capacity. The unit will take up to 275 gph. of mix (550 gal. of ice cream at 100% overrun).

While the company still retains its full-flooded refrigeration system, a quick-dump valve has been added for dropping liquid ammonia into the accumulator to stop freezing action at the end of the run.

Biggest change is in dasher design. The first barrel contains a standard, open mutator, equipped with scrapers. After mix passes through this section it enters the second cylinder. Here, dasher is split. First half is open, last half is solid.

This arrangement produces a drier and stiffer ice cream, according to the company.

# Plate, Tray, and Room Units

**Far from being "finished", these time-honored freezing methods are capitalizing on lower initial cost and maintenance factors**

**THREE OF THE OLDER METHODS for freezing food products are the pressure-plate freezer, the tray-and-cart freezer, and the blast room. All are still used extensively by processors—and likely will continue to be until continuous methods are developed in unitized models that suit the economic demands of more large and small packers.**

## Double-Contact Plates

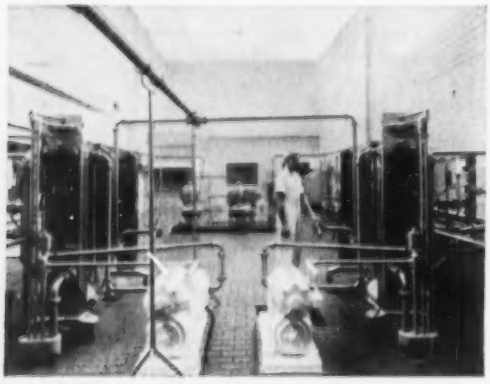
One of the most successful of all freezing methods is the double-contact pressure-plate machine. It is made—in comparable models—by Amerio Contact Plate Freezers, Inc., American Plate Freezer Corp., Dole Refrigerating Co., Barbour-Stockwell Co., and Refrigeration Corp. of America.

In freezers of this type, packaged foods are placed on trays and slid between adjustable, low-temperature plates. These plates are raised and lowered to make contact with top and bottom of the cartons by means of a double-acting hydraulic ram. Spacer sticks between the plates prevent pressure from crushing the packages.

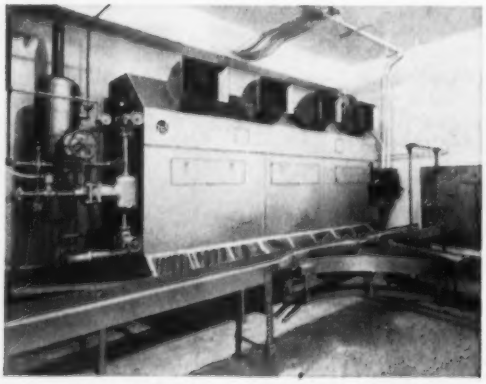
Pressure contact does promote fast freezing. A rule of thumb in the business allows 1 hr. of freezing time for every inch of carton thickness. And of course, the resultant packages have flat surfaces that promote easy stacking in cases and retail cabinets.

A new model of cabinet freezer—employing a different type of full-flooded refrigeration system—has just been announced this month by Refrigeration Corp. of America.

In this machine, ammonia, brine, or Freon flows from accumulator to plates without the restriction of an expansion valve. Conventional systems employ such a valve, and control it from a sensing element



**MODERN MILK PROCESSING** plant in Allentown, Pa., is 100% York-equipped. York HTST Pasteurizers process 200,000 quarts per hour. York recently completed an ice cream hardening tunnel to handle 1300 gallons per hour in any type container.



**TWO YORK IDV-10A** air conditioners keep 120,000-quart milk storage room at an even 35°F. The entire system at Lehigh Valley Cooperative Farmers — over 1100 hp — now includes 14 York compressors in addition to other apparatus.

# YORK® PRIOR PLANNING SERVICE helps assure maximum return on refrigeration equipment investment

- Today's refrigeration systems must meet stringent demands for performance accuracy, operating reliability and length of life.
- York's *5-point* PRIOR PLANNING SERVICE is designed to give you and your consultants the benefits of top refrigeration engineering experience *right from the outset.*
- When you specify York, you know that the intricacies of equipment design, selection, co-ordination, installation, operation and up-keep will be met in the manner your investment merits.

York sales engineers work with you, your consulting engineer and your contractor from the very first planning stage right through start-up . . . and beyond. We call this PRIOR PLANNING SERVICE, and you benefit in these five ways:

**1. You get precise technical data.** The York engineer will help analyze the refrigeration requirements your system must meet including temperature levels, fluctuating loads. Then, he will make available to you all the facts and technical data you need to make your decision.

**2. York helps you select the equipment tailored to your specific system requirements.** York supplies *all* types of refrigeration equipment depending upon the needs of the job. As a result, your York engineer studies your problem *objectively,* recommending the equipment that is right for your job.

**3. You get the most efficient use of time, materials and equipment.** Because of his refrigeration experience, your York engineer can help your engineers and contractor with suggestions in solving design, space problems. Thus he aids in avoiding expensive changes later on, assures the most economical use of equipment and materials in minimum time.

**4. York supervises system installation.** When desired, installation of York equipment is supervised on location by a York engineer who will test and adjust the system, and train your operators to assure you of the highest productivity at lowest cost.

**5. York "insures" against costly downtime.** When you specify York, you can also specify York Certified Maintenance which is your assurance of continuous operation at low cost. With Certified Maintenance you get regular inspections, *all* necessary repairs, unlimited emergency service, start-up and shutdown service, and regular written reports for a nominal annual cost.

York refrigeration system installations include the gigantic environmental laboratory for U. S. Navy, Trenton; Sunkist's California Lemon Exchange; Carling Brewery in Natick, Mass.; Lehigh Valley Cooperative Farmers modern milk plant at Allentown, Pa.; Westinghouse, Baltimore.

You may rely with complete confidence upon the good judgment, recommendations and service of your YORK engineer. Call him *early* in your planning or write — YORK CORPORATION, subsidiary of Borg-Warner Corporation, York, Pennsylvania.

York refrigeration air conditioning YORK B-W

*the quality name in refrigeration*

HEADQUARTERS
FOR MECHANICAL COOLING
SINCE 1885

YORK
CORPORATION
SUBSIDIARY OF BORG-WARNER CORPORATION

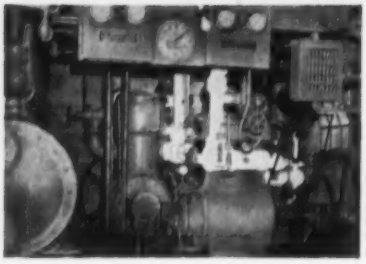
The Tony Downs Foods Co. in St. James, Minnesota, established such an enviable reputation in the preparation, packaging, and fast freezing of fine foods that they are now sold under the Duncan Hines label.

TONY DOWNS FOODS CO.

a Profitable Partnership

DUNCAN HINES

VILTER Refrigeration Equipment



View of the holding freezer where meat and poultry pies are stored after coming from the blast freezer.

Vilter refrigeration equipment showing ammonia booster compressor unit, and 2nd stage compressor and condenser.

Q. How would you successfully quick-freeze 60,000 "name-brand" pies per day?

A. by installing "high-performance," Vilter® REFRIGERATION EQUIPMENT that

costs less to own*

In the Tony Downs plant of St. James, Minnesota, poultry and meat pies are "manufactured" directly in aluminum foil cups. Only a minute is required for a pie to pass down the "assembly" line ready for freezing—60,000 per day.

These pies move into a 50 x 23 foot blast freezer at 45° F. Freezers operate 16 hours a day with a −25° F. air blast . . . 25,000 CFM air circulation. Handling this load are: an 8-cylinder Vilter VMC ammonia booster compressor (40 HP motor) and a 2nd stage 6-cylinder VMC compressor (50 HP motor), and two sets of blast freezer fin coils having 11,470 sq. ft. of surface, plus other Vilter auxiliary units.

Previous success with Vilter equipment for a blast freezer designed to handle 50,000 pounds of poultry per day warranted use of Vilter units for the "pie" freezer. This freezer is handled by a Vilter 13¼" x 10½" VSA booster compressor and an 8½" x 8½" VSA 2nd stage compressor.

The proven operation of Vilter refrigeration equipment in dependably supplying extremely low temperatures efficiently and economically is synonymous with the Vilter trademark. Get dependable refrigeration at reduced overall cost. Specify Vilter!

* Savings in low first cost are not the complete answer when considering the installation of refrigeration equipment. But savings in terms of years of extra service, reliable performance and minimum maintenance — that's where Vilter excels in low-cost ownership.

Vilter®

QUALITY CRAFTSMANSHIP that lasts . . .

ENGINEERING DESIGN that guarantees performance

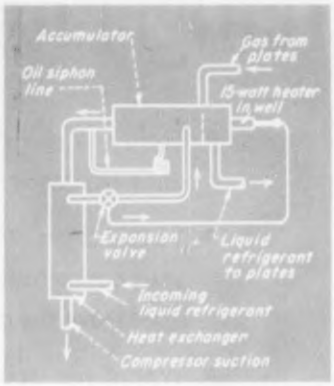
REFRIGERATION and AIR CONDITIONING

THE VILTER MANUFACTURING COMPANY, Milwaukee 7, Wisconsin

Air Units • Ammonia & Freon Compressors • Booster Compressors • Baudelot Coolers • Water & Brine Coolers • Blast Freezers • Evaporative & Shell & Tube Condensers • Pipe Coils • Valves & Fittings • Pakice & Polarflake Ice Machines

located on one of the plates. If plates carry an uneven heat load, the valve can close too soon, thus starving some plate stations.

On the new machine in question, an expansion valve is used—but only as a level control for the accumulator. A 15-watt heater is installed in the accumulator, and connected, electrically, with the expansion valve. When the cold refrigerant surrounds this probe, valve shuts off refrigerant flow to accumulator. When level flows and heating element warms up, valve opens. Baffles in the surge drum prevent incoming refrigerant from splashing on probe.




**REFRIGERATION SYSTEM** diagram on new full-flooded cabinet freezer shows flow of ammonia or Freon to accumulator, and depicts gas cycle.

For further efficiency, cold gas—returning to compressor from top of accumulator—passes through a heat exchanger. Here, it further chills liquid refrigerant entering system from the water-cooled condenser.

Also, a small, bleeder line leads from the bottom of the accumulator to the gas return line. This syphons off any oil before it can build up in the surge drum.

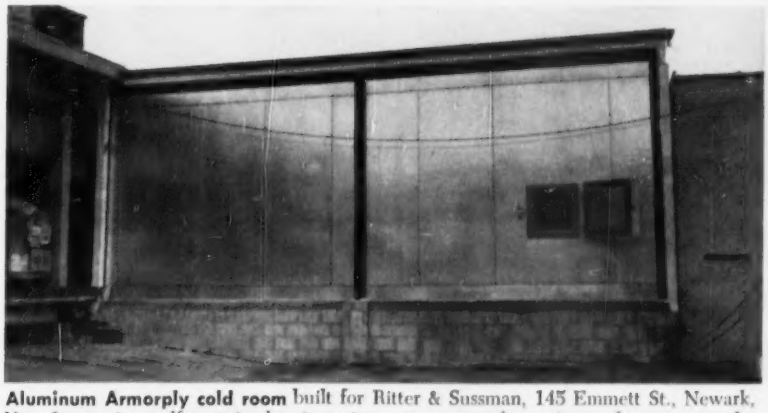
On ammonia, suction pressure is 5-in. vacuum, and plate temperature is −40F. If pressure builds up, a solenoid valve and reverse-acting low-pressure control shuts down liquid ammonia flow and starves plates until vacuum is regained.

The company makes three, cabinet models: A small, six-station machine; a seven-station unit; and a fifteen-station freezer. All models use Dole plates.

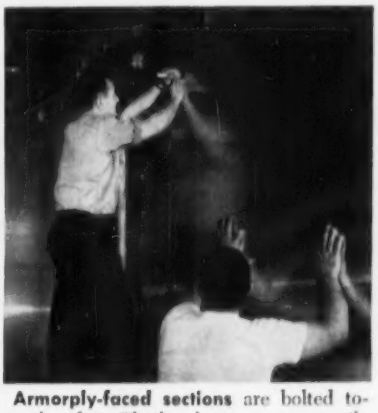
Another cabinet-type freezer (American Plate Freezer Corp.) has double sets of doors that permit speedy, simultaneously loading and unloading of the units from opposite sides. It will handle packages from ½ to 10 lb. capacity, and efficiently

*Frozen food executive* ***Philip E. Ritter*** *tells why he chose* ***Armorply*** *—*

# "We needed sub-zero storage space in a hurry . . . and got it with an Armorply cold room"



**Aluminum Armorply cold room** built for Ritter & Sussman, 145 Emmett St., Newark, New Jersey, is a self-contained unit on its own concrete base. Armorply rooms can be built indoors or outside. Note the window which permits loading directly from box.



**Armorply-faced sections** are bolted together fast. That's why rooms can easily be moved, expanded or altered in shape with untrained labor.

**Q. What led to the installation of your Armorply cold room?**

**A.** If we wanted to keep our 100 employees and 15 trucks going, we needed more storage space . . . and needed it fast. Just as important, because our business is growing so fast, we wanted a cold room that could easily be expanded. We looked 'em all over . . . and found that Armorply cold rooms as manufactured by Freezer Box Division, Annapolis Yacht Yard Inc. filled the bill best.

**Q. How long did it take to build your Armorply room?**

**A.** After the floor was down, both the unloading of the prefabricated sections *and* the assembling of the room took just one week. Full instructions made the workmen's job easy.

**Q. Where is your Armorply room located?**

**A.** Just where we wanted it. Outdoors, next to our loading platform. Only a concrete base and a rain-shedding roof were required to insure dependable operation.

**Q. How big is your Armorply room?**

**A.** It's 32′ x 30′ x 9′. And it holds over 80,000 pounds because there is no waste space. The walls have no troublesome projections, so we have no trouble stacking or moving food.

**Q. Is it easy to maintain sub-zero temperatures in your Armorply room?**

**A.** Believe it or not, we were able to cool the room down to −10° in just 24 hours. And we have no trouble maintaining those sub-zero temperatures because there are actually 8 inches of Fiberglass in the walls.

**Q. What other Armorply features impress you?**

**A.** Our Armorply room is moistureproof and verminproof. And it stays clean and nice looking inside and out. It's really helped our business already, and will help us even more in the future.

★ ★ ★

Armorply is waterproof plywood with a face of stainless steel, aluminum, monel, copper or any other metal permanently bonded to one or both sides. Armorply panels are lightweight, remarkably strong and easy to fabricate. Armorply cold rooms are comparable in cost to ordinary plaster and insulation units.

**Nailing aluminum** to cover joints . . . gives a smooth, easy-to-clean surface.

**Weldwood® Armorply® METAL-CLAD PLYWOOD**

*A product of*

**UNITED STATES PLYWOOD CORPORATION**

*WELDWOOD—The Best Known Name in Plywood*

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☐ Please send me free sample of Armorply and descriptive literature.
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For more data, circle this page number on card at back →

# ANNOUNCING···

# Revised Code Numbers for genetron® SUPER-DRY REFRIGERANTS

**. . . in the interest of standardizing refrigerant terminology and nomenclature**

| PRESENT GENETRON CODE NUMBER | CODE NUMBER TO BE USED EFFECTIVE JAN. 1 | COLOR-CODE | REFRIGERANTS |
|---|---|---|---|
| **genetron 11** | **11** | ORANGE LABEL | TRICHLOROMONOFLUOROMETHANE |
| **genetron 12** | **12** | WHITE LABEL | DICHLORODIFLUOROMETHANE |
| **genetron 141** | **22** | GREEN LABEL | MONOCHLORODIFLUOROMETHANE |
| **genetron 226** | **113** | PURPLE LABEL | TRICHLOROTRIFLUOROETHANE |
| **genetron 320** | **114A** | DARK BLUE LABEL | DICHLOROTETRAFLUOROETHANE |

In the interest of helping to standardize refrigerant terminology and nomenclature, General Chemical is adopting the revised code numbers shown above for its "Genetron" Super-Dry Refrigerants, effective January 1, 1957.

These numerical designations reflect recommendations of trade and technical associations throughout the industry which have been working jointly and independently on many standardizations, including a common numerical code system for fluorinated hydrocarbon refrigerants.

The numerals for two of the most widely used "Genetrons"—"Genetron" 12 and "Genetron" 11—already conform and, accordingly, are not being changed.

"Genetron" Super-Dry Refrigerants are stocked and recommended by America's leading air conditioning and refrigeration wholesalers. When ordering from them in the year ahead, please use these revised code numbers to designate the "Genetrons" you need.

GC Allied Chemical

*Basic Chemicals for American Industry*

GENETRON DEPARTMENT

**GENERAL CHEMICAL DIVISION**

ALLIED CHEMICAL & DYE CORPORATION

40 Rector Street, New York 6, N. Y.

freeze a carton up to 2½-in. thick.

Three standard models are made. The smallest is a six-station unit with 44x24-in. plates that will turn out 240, packages (1 lb.) of fish fillets per hour. It has a self-contained, 7½ hp., water-cooled Freon 12 refrigerating unit.

The next size has 20 stations and 56x43 in. plates. This model will handle 1,600 cartons (1 lb.) of fillets hourly. The largest freezer made by American is also a 20-station unit with plates measuring 71x43 in. It takes 2,300 cartons/hr.

Cabinets are of all-welded construction with 6 in. of insulation. They can be adapted for ammonia, Freon, or brine refrigerants.

Refrigeration needs for this type of freezer are best illustrated by Dole Refrigerating Co.'s installation at the Birds Eye poultry and pie freezing plant in Pocomoke, Md.

Here, seven Dole units have a full-flooded forced-circulation ammonia system, fed from a common surge drum on the roof of the plant. Refrigeration is supplied by a 15x10 reciprocating booster and 10x10 reciprocating high side compressor (both driven by a single, 200 hp. motor). Refrigerant temperature is held at −30F. (see table for capacity and tonnages of different models).

Two pumps circulate liquid ammonia through the plates, and orifices at each plate even out the flow.

Plates are constructed of two steel sheets, with square steel tubing wound between them (bent on 2-in. centers) for the refrigerant. After plates are welded together, a vacuum is drawn on the inside air space. This pulls sheets against the tubing with a force of nearly 1,000 lb. per sq. ft. to form a tight bond between freezing surface and actual refrigeration conductors.

The resultant plate component is very light. It is also used in Birds Eye's newer Model E freezers (made by Barbour-Stockwell Co.). The older Model B freezers have a solid aluminum plate (about 2 in. thick) with 1-in. refrigerant holes bored through them.

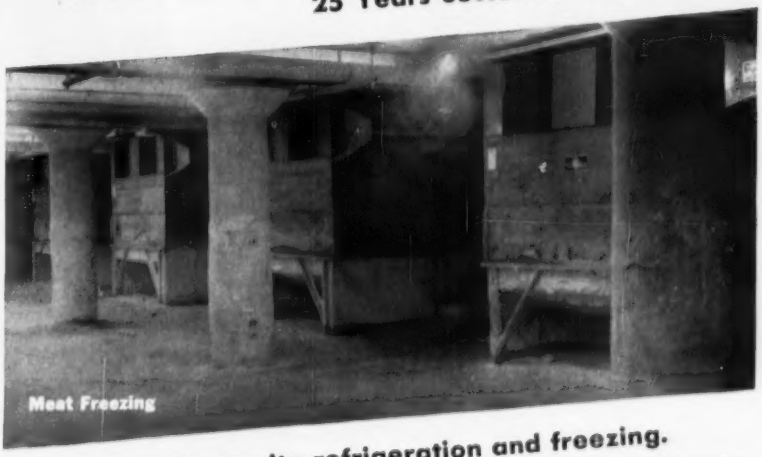
## Continuous & Batch Cart Tunnels

Tray-and-cart blast tunnels are quite popular for freezing a large variety of foods. They are particularly useful for bulk products, such as whole poultry, fish, and meat cuts. The product is loaded on trays, which are then placed on shelves in the carts.

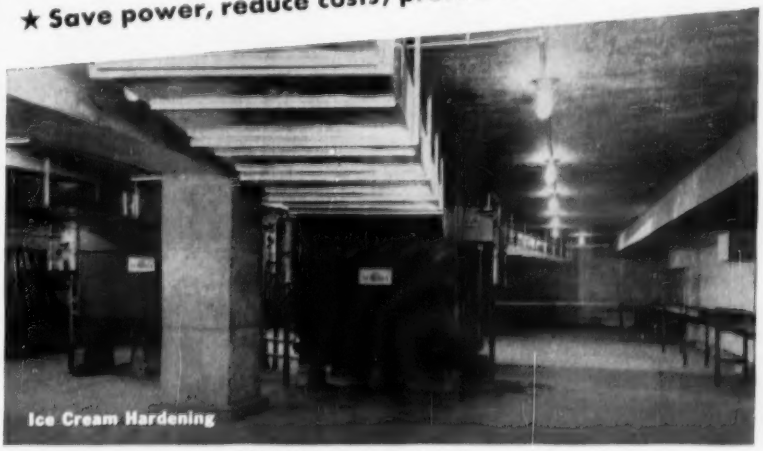
Terminal Warehouse Custom Freezing

NIAGARA "NO FROST"

25 Years' Successful Experience


Meat Freezing

★ Always full capacity refrigeration and freezing.
★ "No Frost" removes moisture as fast as it condenses.
★ Save power, reduce costs; protect frozen food quality.

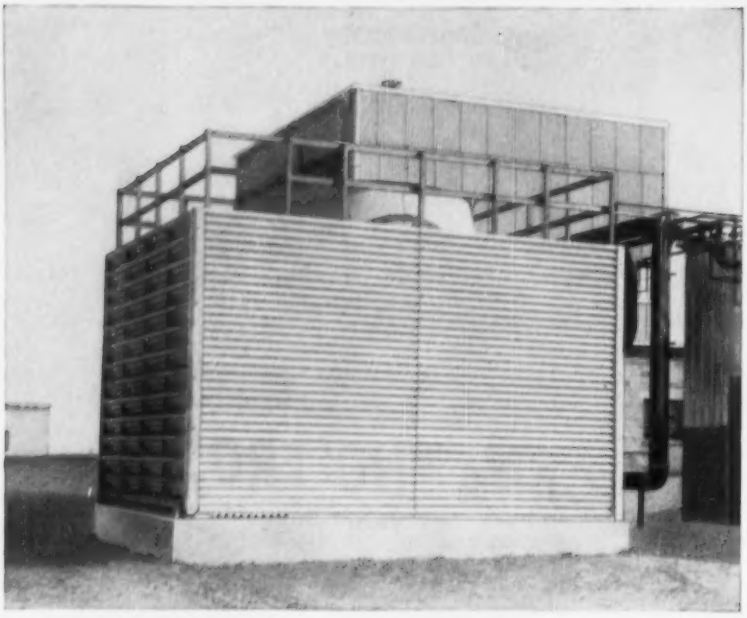

Ice Cream Hardening

*Write for Niagara Bulletin 105*

NIAGARA BLOWER COMPANY

Dept. F.I., 405 Lexington Ave. New York 17, N. Y.

*District Engineers in Principal Cities of U. S. and Canada*



*Plant Engineers "Discover" the*

# Marley Double-Flow Aquatower*

**Ask a progressive plant engineer what intermediate-capacity cooling tower offers every performance and maintenance advantage of large industrial towers, and chances are 9 to 1 he'll say, "Marley's Double-Flow Aquatower"! This tower that combines big-tower performance with small-tower compactness is today "the hottest thing in cooling" for industrial services involving intermediate-gallonages.**

**Only the Double-Flow Aquatower gives you the many plus-performance features developed for huge Marley industrial towers—open distribution . . . extra-rugged structure . . . more-than-adequate fill, drift eliminators, and fan cylinders . . . Marley-designed fans and Geareducers . . . easy-access maintenance. And this complete cooling tower is a streamlined, space-saving unit for it is the *original low-silhouette* tower.**

**There just isn't anything like the Double-Flow Aquatower, and if you haven't yet "discovered" it, get in touch with your Marley Application Engineer in any of 55 cities. He'll show you the complete line in wood or steel structure with asbestos cement board casing, in single or multi-cell units. *Call him today or —***

*WRITE FOR BULLETIN DFAQ*

*Reg. Trademark

MARLEY

***The Marley Company***

Kansas City, Missouri

In general, they can be classified in two types: The continuous unit, and the batch freezer.

A continuous method designed by Vilter Mfg. Co. employs a floor conveyor to pull trucks through the tunnel. Air blast is directed perpendicular to the direction of cart movement. Thus all of the moveable carts receive air at the same sub-zero temperature. This quickly surface-freezes incoming product, eliminating such quality-killing problems as "bloody run down" in poultry (produced by slow freezing).

This company's units are constructed with a large amount of bare coil or finned-tube surface. And they are designed for full-flooded operation, with short refrigeration circuits that provide positive flow of liquid ammonia.

In the batch-type operation, carts are loaded into the freezer and are not moved until the entire load is frozen. This is particular adaptable where production is small.

But one big company is successfully using this type of installation. The unit in question (designed by York Corp.) is installed at Beare Ice & Coal Co., Humbolt, Tenn. The company put in the freezer to utilize its refrigeration capacity on a year-around basis, and employs it for strawberries, also for freezing meat and other food products out of the strawberry season.

The installation consists of two 77-ft. tunnels for freezing and a central coil-equipped holding room for the finished product.

Air flow passes from fans through the coil banks (located over the cart tunnels), and back to the fans through the loaded carts.

The rated design is for 152,000 lb. of strawberries per day. But it has topped 200,000 lb. per day in a pinch.

On the basis of rated capacity, refrigeration load is 97 tons at –35F. evaporator temperature. To achieve this, the two tunnels have a total of 39,700 linear feet of 2-in. full-weight pipe coils. Two 25-hp. fans in each section provide the powerful air blast.

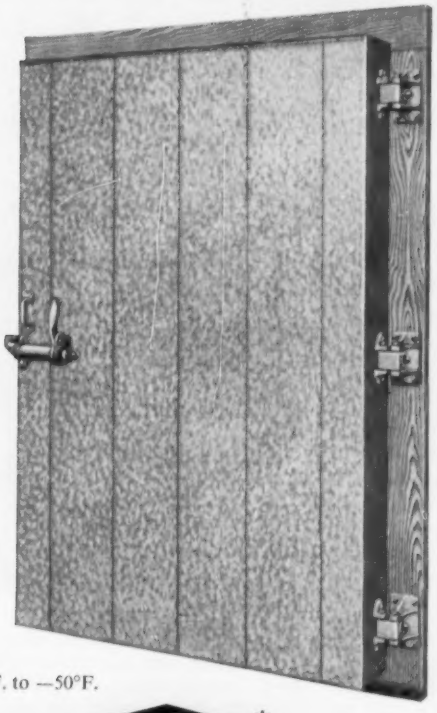
Low stage compressors consist of a 60-hp., 6¼x5-in., 8-cyl. V/W (20 rpm.), and a 40-hp., 3¼x3-in., 16-cyl. V/W (1,170 rpm.).

Existing ice plant compressors are used for the high stage. They comprise a 60-hp., 8x8-in., 2-cyl. unit (300 rpm.), a 75-hp., 9x9-in., 2-cyl. machine (300 rpm.), a 100-hp., 10x10-in., 2-cyl. compressor (300 rpm), and a 200-hp., 10x8-in., 4-cyl. unit (360 rpm.).

They use two 42-in.x14-ft., ver-

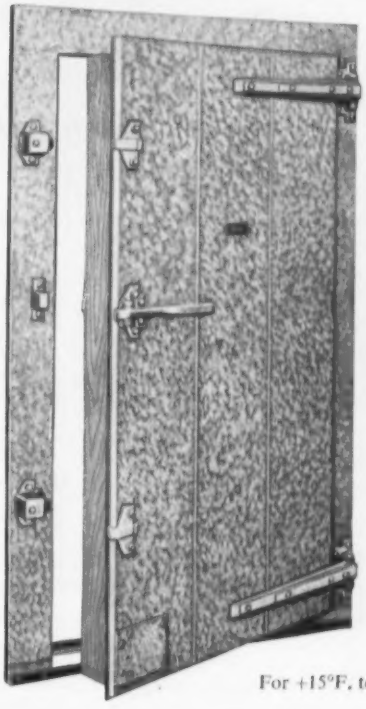
# *NEW* Jamison VAP·R·TYT feature

## ...on all SUPER FREEZER DOORS



For 0°F. to —50°F.

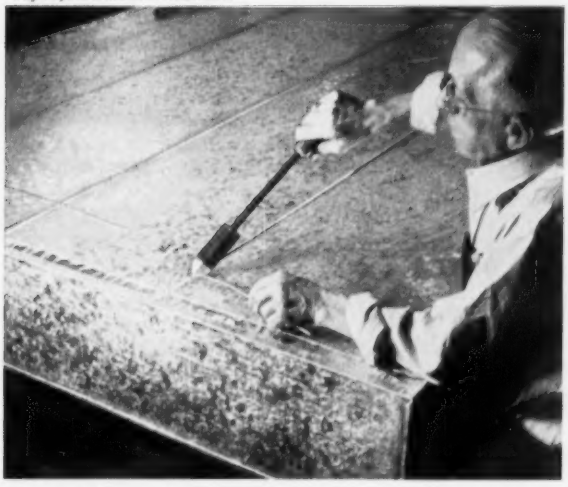
## ...on all LO-TEMP DOORS



For +15°F. to —20°F.

# VAP·R·TYT* offers full protection against moisture penetration

**Vap-r-tyt is a Jamison trademark*



**Soldered Seams.** All seams are locked and then soldered to prevent moisture under high vapor pressure from penetrating into the core of the door.

Vap-r-tyt . . . the application of metal with locked and soldered seams with all penetrating bolts sealed, is an exclusive Jamison feature. Vap-r-tyt adds longer life to cold storage doors by guarding against deterioration which invariably results when moisture condenses on the inside of the door. Jamison Super Freezer and Lo-Temp Cold Storage Doors are now being furnished with Vap-r-tyt as standard equipment.

For further information on Vap-r-tyt write to Jamison Cold Storage Door Co., Hagerstown, Md.

JAMISON
HAGERSTOWN, MARYLAND, U. S. A.

*More* JAMISON Doors are used by *more* people than any other Cold Storage Door in the world.

# Simplest pneumatic controller to use and maintain

*Bristol gives you improved stability of control action –but keeps basic simplicity of Series 500 Controllers*

Bristol Series 500 Pneumatic Controllers are the easiest controllers on the market to use and maintain–still the most dependable and trouble-free.

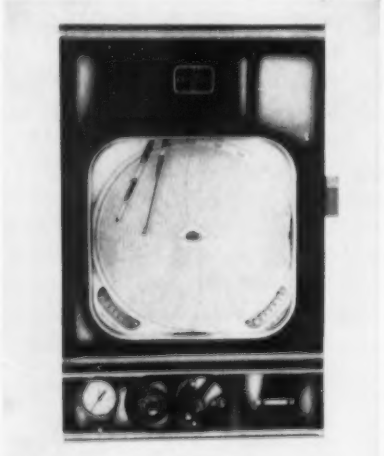
The reason? The basic simplicity of the operating mechanism. *That* hasn't changed in the years since we introduced this long-time favorite among instrument men. Reason No. 2: they are equipped with famous Bristol measuring elements.

### Easy calibration

It's this foolproof simplicity of the control system that makes calibration so easy on Series 500 controllers. *Only one* service adjustment is required and provided to exactly calibrate the control system. The control system can be completely disassembled and after reassembly (even with replacement of parts) can be restored to precise calibration with this *one* adjustment.

No special tools are required. A ¼-inch wrench is all that's needed.

The 500's completely interchangeable parts, accurately designed and manufactured to extremely close tolerances, make possible this built-in calibration.



**BRISTOL'S® SERIES 500 CONTROLLER**, shown here with four-position transfer station. Internal station also available.

### And check these features:

**Improved control stability**—advanced automatic control techniques have been applied by Bristol engineers to improve stability of control action in the new Series 500W Controllers.

**Wide-band models** offer choice of ½ to 400% proportional band with simple band shift.

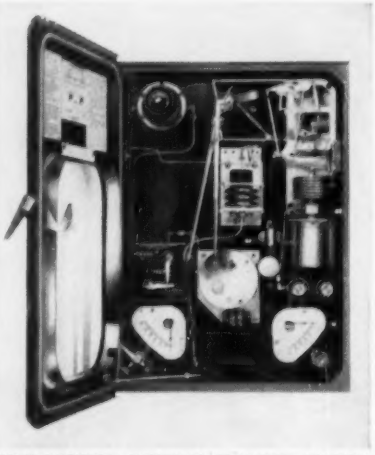
**True zero derivative setting**—exclusive with Bristol.

**Reset action stops** in reset models—again a Bristol exclusive—prevent loss of control due to prolonged deviation from set point.

**Four-position internal transfer station** with automatic, manual, test, and service positions, plus pressure-matching button and manual pressure regulator, for maximum convenience in process control.

### Complete data available

Write today for engineering data on Bristol's Series 500 controllers for your critical control problems. They're available for *automatic control of temperature, pressure, vacuum, draft, absolute pressure, liquid level, humidity, pH value, electrical measurements, and mechanical motion.* The Bristol Company, 115 Bristol Road, Waterbury 20, Conn.



**FOUR-POSITION INTERNAL TRANSFER STATION** shown here in interior view of Series 500 Controller. Permits remote manual control, testing and servicing without disconnecting instrument.

**YOU CAN GET THESE CONTROL MODES:**

1. **Fixed narrow band** (on-off)
2. **Proportional band**—½ to 100% and ½ to 30%.
3. **Reset with wide band**—rates 0.1 to 10 or 1 to 300 repeats per minute. Proportional band ½ to 400%.
4. **Derivative (rate)**—½ to 100% proportional band. Derivative time 0.2 to 20 min., plus zero derivative setting.
5. **Reset plus derivative**—proportional band and reset rate as in "reset" above. Derivative time as in "derivative" above.

**YOU CAN HANDLE THESE CONTROL PROBLEMS:**

1. Cascaded control 2. Selective control 3. Ratio control 4. Time-program control 5. Pneumatic transmission.

6.55

**BRISTOL** *TRAIL-BLAZERS IN PROCESS AUTOMATION*

**AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS**

tical, open, single-pass, shell-and-tube condensers. The high-stage load is 111 tons, at 9-lb. suction and 155 tons discharge.

## Blast Rooms for Bulk Foods

Probably the simplest way to freeze foods is in the venerable blast room. It has long been used for ice cream and a wide range of bulk-packaged foods.

A basic system handles apple slices (45,000 lb./day), strawberries (15,000 lb./day, sour cherries, (22,500 lb/day), and peaches (15,000 lb./day), processed in institutional-sized 30-lb. pails.

The installation, designed by H. S. Chapman, Rochester, consists of a room measuring 41x20 ft. with a false ceiling, a vertical coil bank, and fans.

Air blast (held at −20 to −30F.) passes up through the coils, and is blown across the false ceiling. It circulates down through the product and back to the coils. Refrigeration load is about 50 tons.

The product is pre-chilled in an adjacent room (20x20 ft.), held at zero by ammonia coils (5 tons). Entire freezing cycle takes about 18 hr.

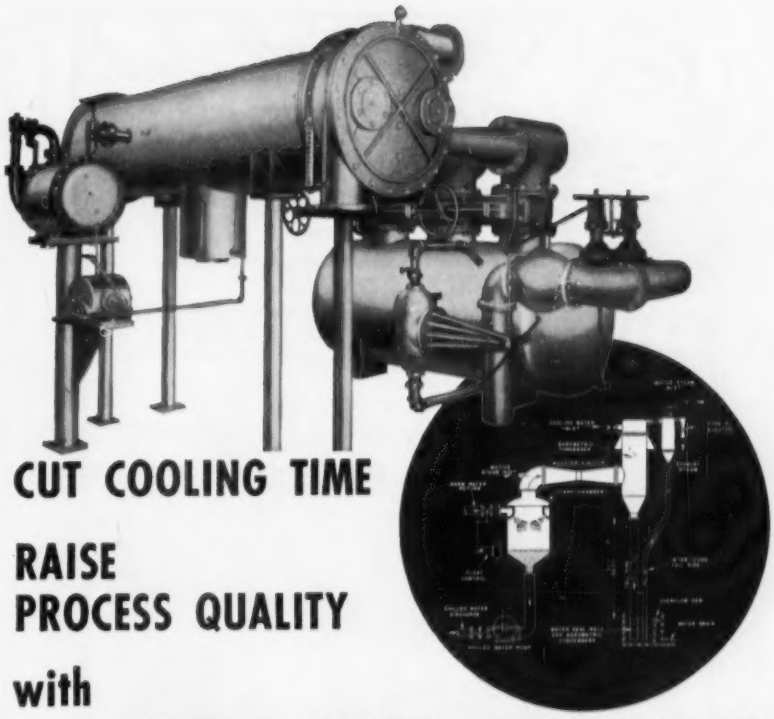
A somewhat fancier room is employed by Arnold Bakers, Inc., Port Chester, N. Y., for quick freezing bread at the rate of 1,000 lb. per hr.

This set-up consists of a 40x40-ft. room, 10-ft. high. A slung ceiling forms a plenum chamber, into which freezing air is blown from two, finned-coil unit coolers (Niagara Blower Co.).

Each of these units has a capacity of 7 tons of refrigeration at −15 to −20 evaporator temperature, and a normal air circulation of 11,000 cfm. per unit. Provision has been made for installation of another unit if increased production warrants it.

In the false ceiling, seven ¾-hp. fans serve as boosters, whipping the air around the room in an even pattern to expedite product freezing. Each fan has a capacity of 11,000 cfm. and is manually controlled.

Refrigeration for this installation is installed in a room behind the freezer. The two-stage Freon system employs a 30-hp. rotary compressor (Fuller) for the low stage. Suction is 5.5-in. vac, discharge is 37 psi. High stage is carried by a 25-hp. multi-cylinder reciprocating compressor (Carrier Corp.) that discharges at 125 psi. An air cooled condenser (Carrier) serves both

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RAISE PROCESS QUALITY

with

C. H. WHEELER VACUUM REFRIGERATION

Employing the principle of flash evaporation, here's what C. H. Wheeler Steam Jet Vacuum Refrigeration will give you in food processing:

***Low initial cost of equipment in standard assemblies consisting of steam jet ejectors, boosters, barometric or surface condensers and water pumps • Low installation cost • Low cost operation using plant steam at pressures down to 2 psi • Savings in space in plant, on roof or outdoors • Savings on maintenance, because there are no moving parts in a steam jet vacuum system except the chilled water pump • Uniform production capacity, because there is no wear or scale formation • Easy operation with either manual or automatic instrument control • Overload capacity without damage • Economical operation at part load • Maximum safety, no noxious gases, no pressure or explosion hazard • No noise or vibration • Cooling to any temperature above 35° F.***

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*Investigate the possibilities in your plant for C. H. Wheeler Steam Jet Equipment. Write for Bulletin 1462 and name of nearest representative.*

C. H. WHEELER MANUFACTURING CO., 19th & Lehigh, Philadelphia 32, Pa. WE 606 R

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*Do the Best Quick Freezing Job*

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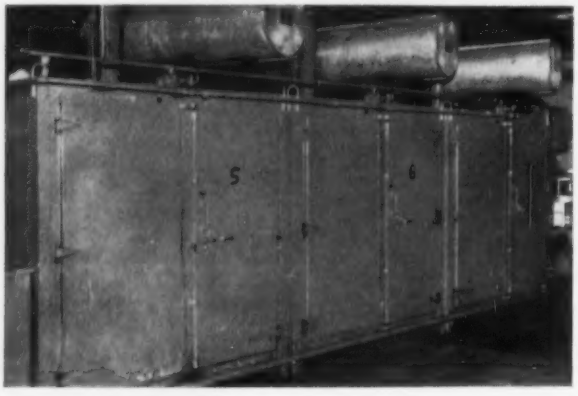

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*Amerio*
Contact Plate Freezers Inc.
Union City, N.J.
*It's the Contacts that Count*

*Send For Illustrated Brochure*


freezer compressors and a 10-hp. unit for the storage area.

Finally, "No-Frost" solution is sprayed over coils in the unit coolers to prevent accumulation of frost. The system contains a spray pump, filter box, heating coil, and fan. Moisture removal capacity is 15 gph.

## MANUFACTURERS LIST

American Plate Freezers Corp., 211 Northern Ave., Boston—Pressure-plate freezers

Amerio Contact Plate Freezers, Inc., 128-36 44th St., Union City, N. J.—Pressure-plate and continuous plate freezers

APV Co. Inc., Buffalo—Continuous liquid freezer

Barry-Wehmiller Mchy. Co., 4662 W. Florissant Ave., St. Louis—Spray freezer

Belt Ice Corp., 3400 16th St., Seattle 99, Wash.—Continuous plate freezer

Cherry-Burrell Corp., 427 W. Randolph St., Chicago—Continuous liquid freezers

Creamery Package Mfg. Co., 1251 W. Washington Blvd., Chicago 18—Continuous liquid freezers

Dole Refrigerating Co., 5910 N. Pulaski Rd., Chicago 30—Pressure-plate freezer

FMC Co., 333 W. Julian St., San Jose 5—Continuous immersion freezer

Finnegan Co., Wm. J., 2121 Pasadena Ave., Los Angeles 31—Tubular and tray-and-cart freezers

Freezing Equipment Sales, Inc., 1405 N. Duke St., York, Pa.—Continuous "shelf" and belt freezers

Girdler Corp., Votator Div., 222 E. Broadway, Louisville 1, Ky.—Continuous liquid freezer

Greer, J. W., Co., 119 Windsor St., Cambridge, Mass.—Continuous tray freezer

King Co., 908 N. Cedar St., Owatonna, Minn.—Blast room freezers

Niagara Blower Co., 405 Lexington Ave., New York 17—Blast room freezers

Proctor & Schwartz, Inc., 7th & Tabor Rd., Philadelphia—Continuous plate freezer

Refrigeration Corp. of America, 19 W. 44th St., N. Y. C.—Pressure-plate freezers

Vilter Mfg. Co., 2217 S. First St., Milwaukee—Blast freezers

Worthington Corp., 426 Worthington Ave., Harrison, N. J.—Continuous belt and blast room freezers

York Corp., Roosevelt Ave., York, Pa.—Continuous plate and belt freezers



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# SHORT STACKER

Compact Yale K51W electric truck maneuvering in a 9'10" stacking aisle.

## SHORTEST SITDOWN ELECTRIC TRUCK OPERATES IN 9'10" AISLE SPACE

This new Yale Truck – only 68¼" from front face of forks – is the shortest 3,000-4,000 lb. capacity sitdown electric truck engineered. Increases warehouse space by enabling quick, easy maneuvering for stacking from a 9'10" aisle. No fumes, no odors, and with this compact Yale Truck you get all these big truck features:

**"DEAD MAN" CONTROL**–automatically shuts off power and applies brakes when the operator leaves his truck.

**EXCLUSIVE CAM-O-TACTOR**–controls speed increase by automatic time-delay setting for smooth travel.

**15° TILT-BACK** for extra load stability when the truck is in transit; greater ease of narrow-aisle operations.

**FULL 110 SQ. IN. BRAKING SURFACE** equal to that of higher capacity trucks for reliable stopping power.

**SIDE THRUST ROLLERS** on both carriage and channel. Minimize friction and stress with over-center loading when lifting and lowering heavy loads.

For all the facts about this new Yale Truck send for Bulletin 5150A. Mail coupon today.

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*REG. U. S. PAT. OFF.

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Pencil and ruler line up the answers.

# Use This Chart

UNFOLD HERE →

## For Quickly Calculating Cooler Efficiency, Design

**Handy nomograph simply 'totes up' vital refrigeration tonnage and performance and cooling water demands**


**RAYMOND R. HAUGH**

Chief Applications Engineer, Quartermaster Food & Container Institute, Chicago


KEEPING TABS on the efficiency of your food cooling equipment is vital. Further, it is a must that all factors are "right" when you design a new chilling system.

You can do your calculations in a flash with this handy food thermal chart–presented complete in these foldout pages. It's quick and easy to use, and can be adapted for liquid, batch, and continuous conveyor-cooling systems in the range of 32 to 212F.

To operate economically, a packer must know the efficiency of his system. The amount of cooling needed to reduce temperature of a given number of pounds of food per hour depends upon the specific heat of the food, and the temperature drop.

The tons of refrigeration needed to cool this amount of food is inversely influenced by efficiency of the cooling systems.

This computer, or nomograph, comprises 15 logarithmic scales– A to P on the foldout chart at right. And operation of the entire calculator involves seven, overlapping steps–each consisting of three variables, two known and one unknown.

Chief feature of this chart–as in the food thermal computer for heating (FE Oct., p. 47)–is that the plant engineer can see at a glance the effect each factor has on the others. And he can shift variables with no time-consuming pencil figuring.

The first five steps cover production, processing equipment, time cycles, weight of product, specific heat, drop in product temperature during cooling, and Btu.'s given up per hour by the food.

Step 6 shows relationship between the number of Btu.'s given up by the product per hour over a set number of degrees and the tons of refrigeration needed to effect this drop. Ratio of these factors (times 100) is the thermal efficiency of the cooling equipment.

Step 7 reveals correlation of tons of refrigeration to temperature rise in cooling water, and total amount of water needed for the job.

Here's the seven-step procedure–explained with a dotted-line example–for applying this computer:

**Step 1:** Connect, with a straight line, the number of pieces per foot on Scale A (20, in example) through length of conveyor in feet (Scale B, 10 ft.). Total number of pieces on conveyor is point of intersection with Scale C (200).

**Step 2:** Join Scale C to Scale D (time product is on conveyor, 15 min.) with a similar line. Extension of the line to Scale E is the number of pieces processed in an hour (800).

**Step 3:** Place straight-edge on Scale E and Scale F (weight per piece, 0.6 lb. in example). Pounds of food processed hourly is thus revealed on Scale G (480 lb.).

**Step 4:** Connect Scale G through Scale H (specific heat of food, found in table at bottom of page) to Scale I, where number of Btu. required per degree F. per weight per hr. is found (240 on the dotted line).

**Step 5:** Scale I joined to Scale J (temperature drop in product, 40 deg.) reveals total number of Btu. given up per hour by the product (9,600 Btu. on Scale K).

**Step 6:** If efficiency of the system is known, connect Scale K through Scale L (50% efficiency, for example) to get the necessary refrigeration tonnage (1.6 tons).

If efficiency is the unknown factor, refrigeration tonnage must be measured. One way of doing this on water-cooled systems is to jump to Scales P and O. Measure gallons of water used and temperature rise. A straight line through these figures will show refrigeration tonnage. Then efficiency can be plotted with a second straight line between Scales N and K.

**Step 7:** To return to the dotted line example, with tonnage plotted, necessary amounts of cooling water (Scale P) can be discovered by connecting Scale N through Scale O (cooling water is raised 30F.). Final answer on Scale P is 80 gal. of water per hr.

On batch cooling and fluid cooling systems, start with Scale G–figuring the number of pounds of food cooled and pumped per hour, respectively.

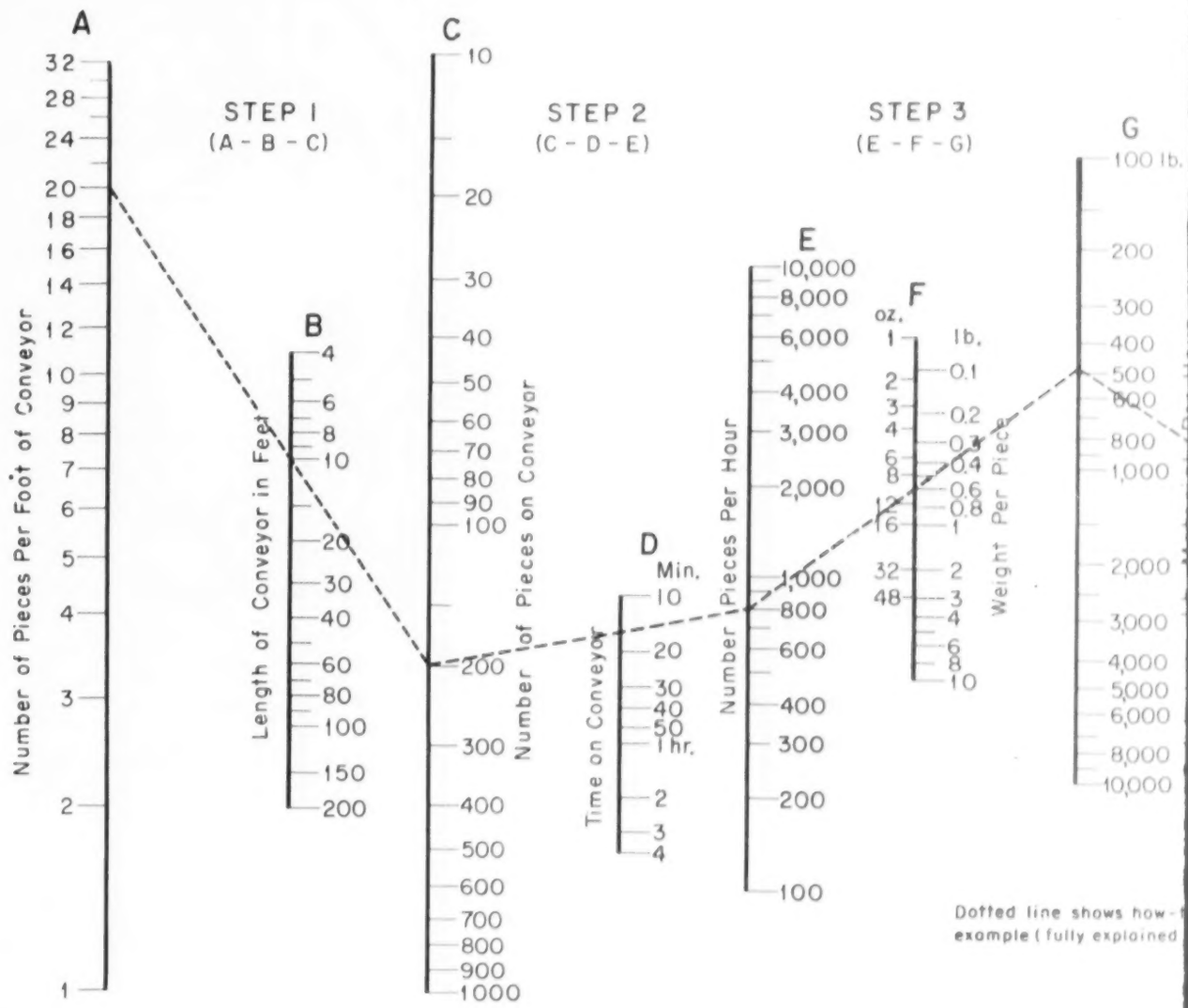
*A limited number of reprints of this special chart are available at a price of 50¢ each.*

**CHECK HERE for Specific Heat of Foods (Used in Chart's Scale H)**

| Food | Specific Heat (Btu./lb./deg. F.) | Food | Specific Heat (Btu./lb./deg. F.) |
|---|---|---|---|
| Whole milk | 0.92 | Fresh mushrooms | 0.94 |
| Skim milk | 0.95 | Fresh peas | 0.85 |
| Butter | 0.49 | Potatoes | 0.84 |
| Fresh fish | 0.86 | Spinach | 0.90 |
| Fresh berries | 0.89 | Onions | 0.91 |
| Fresh fruits | 0.80 | White bread | 0.65 |
| Dried fruits | 0.50 | Flour | 0.43 |
| Bacon | 0.48 | Grains | 0.45 |
| Fat beef | 0.69 | Salt | 0.27 |
| Lean beef | 0.82 | Raisins | 0.47 |
| Fat pork | 0.62 | Rice | 0.42 |
| Lean pork | 0.73 | Egg white | 0.92 |
| Bones | 0.40 to 0.60 | Egg yolk | 0.69 |
| Fresh carrots | 0.86 | | |

TEAR OUT AND FILE

## THIS COMPUTER SPEEDS YOUR FIGURING OF REFR



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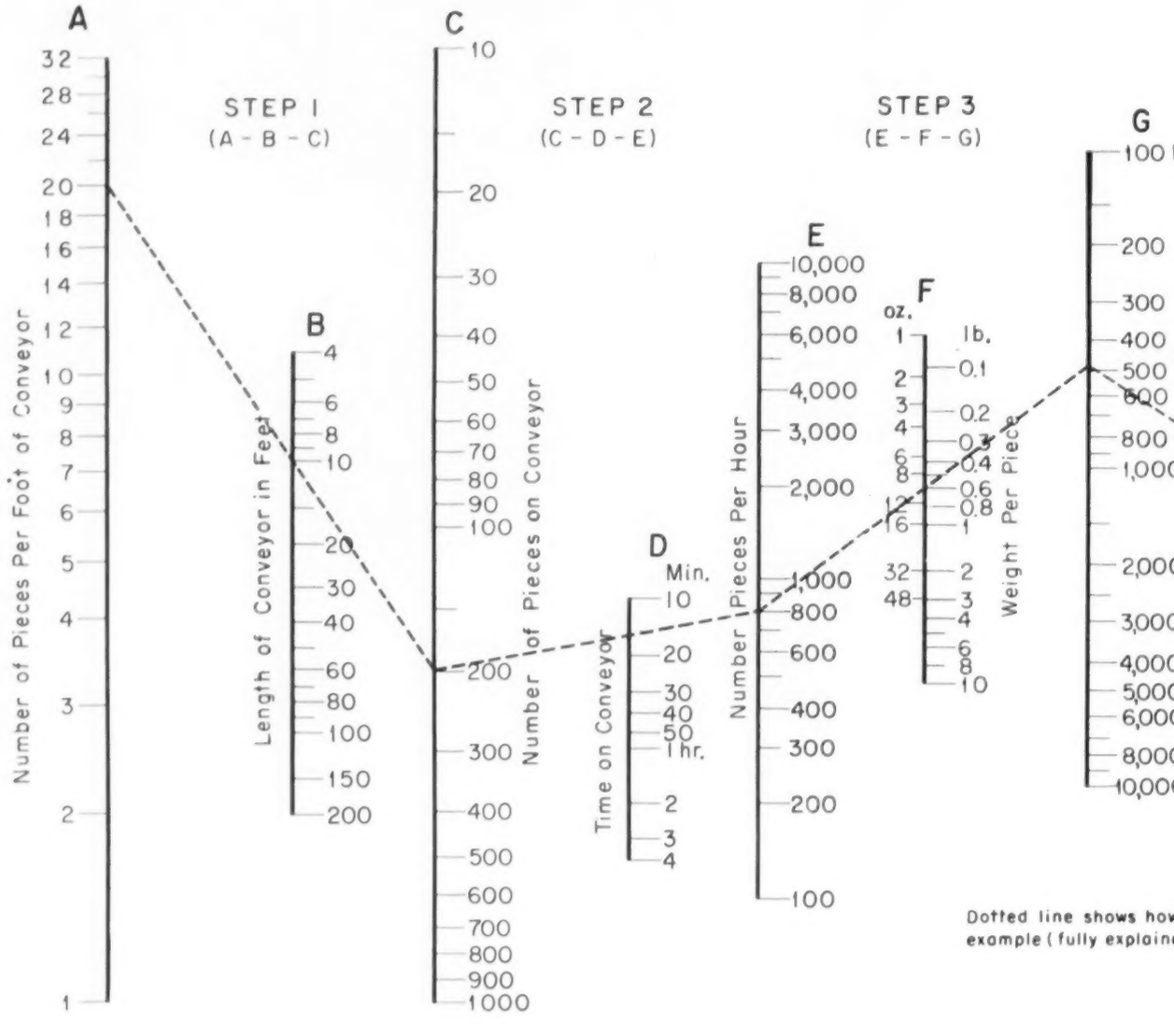
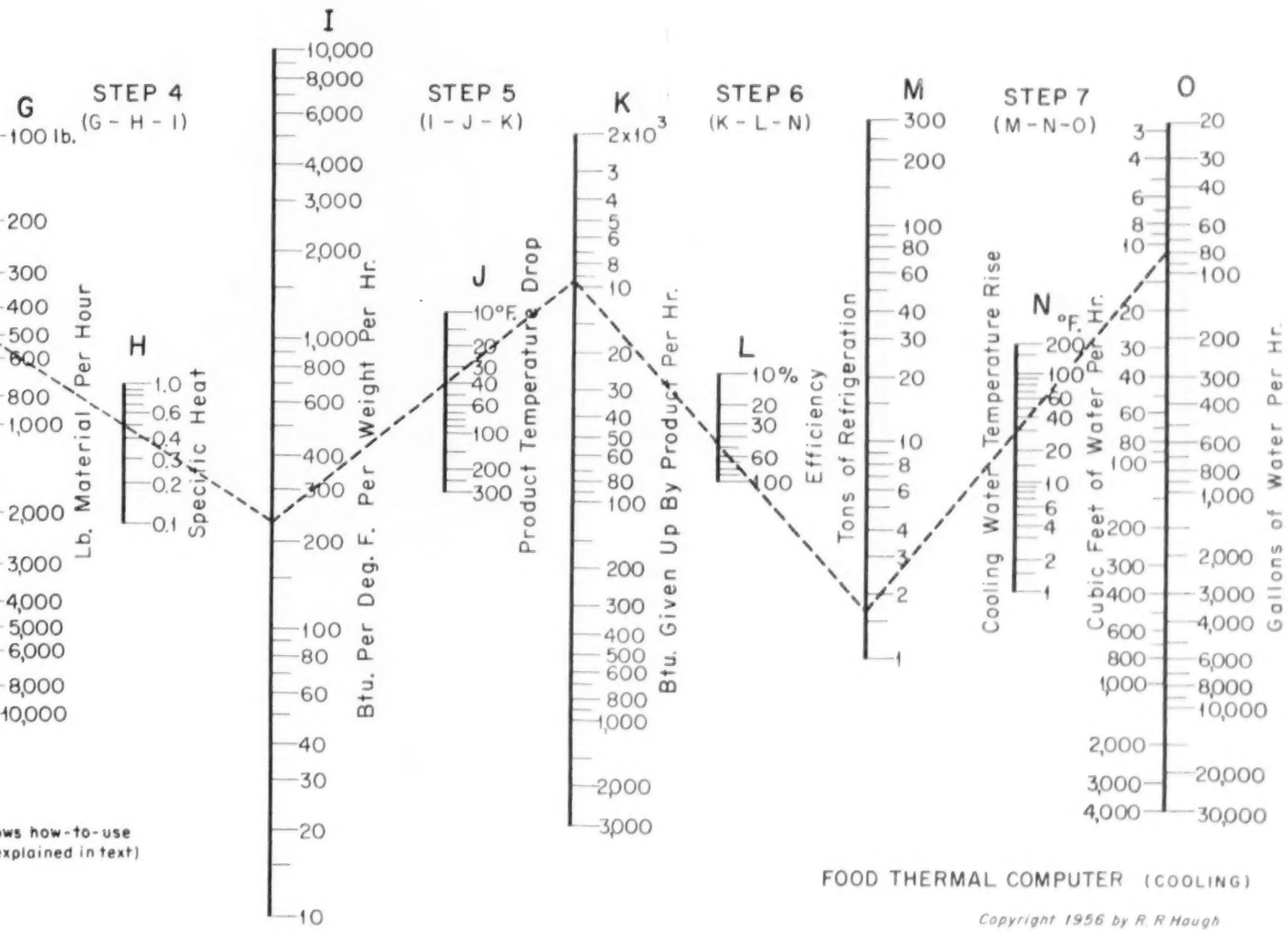



Dotted line shows how
example ( fully explain

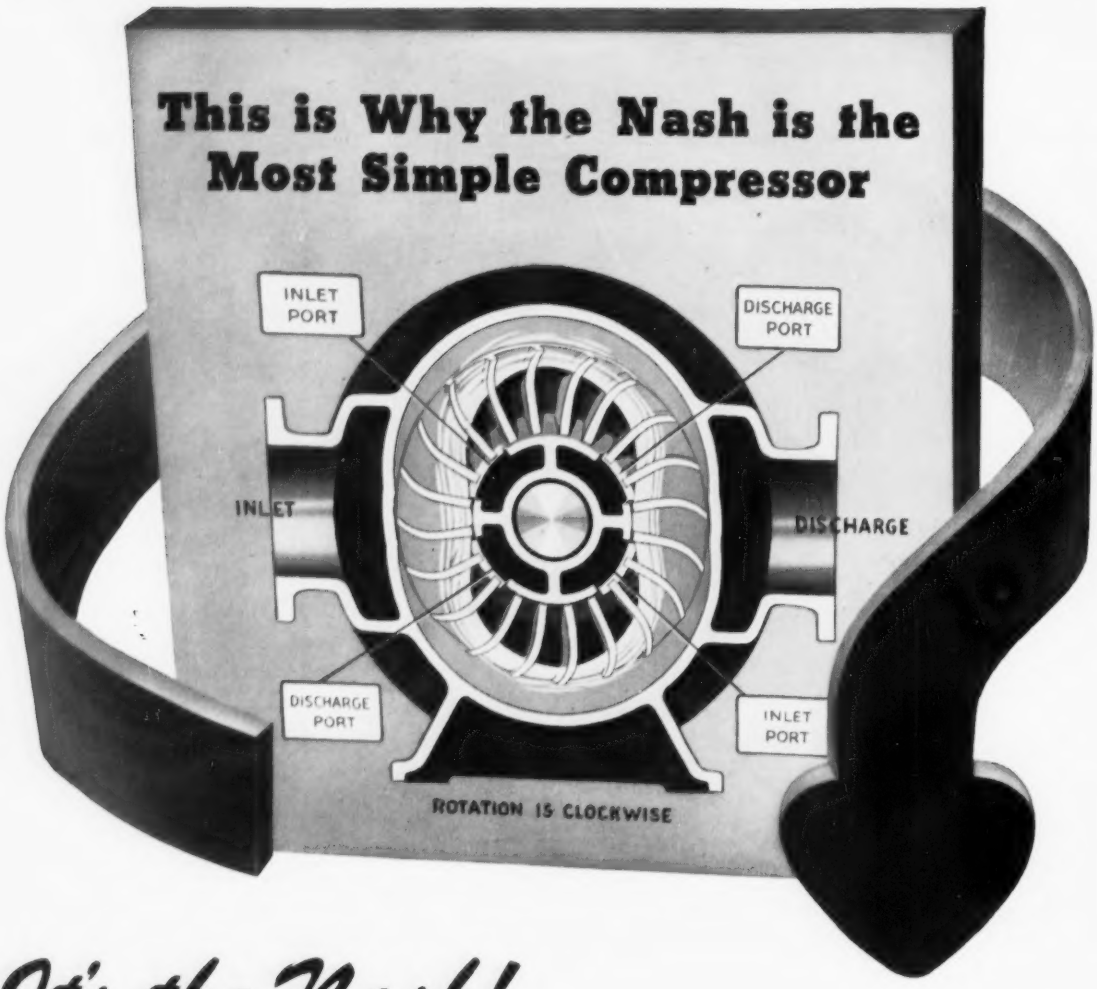
## REFRIGERATION NEEDS AND EFFICIENCY IN FOOD COOLING SYSTEMS




FOOD THERMAL COMPUTER (COOLING)

Copyright 1956 by R. R. Haugh

# This is Why the Nash is the Most Simple Compressor




# *It's the Nash!*

There are no mechanical complications in a Nash Compressor. A single moving element, a round rotor, with shrouded blades, forming a series of buckets, revolves freely in an elliptical casing containing any low viscosity liquid. This liquid, carried with the rotor, follows the elliptical contour of the casing.

The moving liquid therefore recedes from the rotor buckets at the wide part of the ellipse, permitting the buckets to fill with gas from the stationary Inlet Ports. As the casing narrows, the liquid is forced back into the rotor buckets, compressing the gas, and delivering it through the fixed Outlet Ports.

Nash Compressors produce 75 lbs pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure. Since compression is secured by an entirely different principle, gas pumping problems difficult with ordinary pumps are often handled easily in a Nash.

Nash simplicity means low maintenance cost, with original pump performance constant over long periods Data on these pumps sent immediately on request

**No internal wearing parts.**

**No valves, pistons, or vanes.**

**No internal lubrication.**

**Low maintenance cost.**

**Saves floor space.**

**Desired delivery temperature automatically maintained.**

**Slugs of liquid entering pump will do no harm.**

**75 pounds in a single stage.**

**NASH ENGINEERING COMPANY**
**313 WILSON, SO. NORWALK, CONN.**

*MAKES THE TASTE BUDS TINGLE* just to look at these eye-filling gelatin dessert delicacies. But *sight appeal* is not enough; your easy-to-prepare dessert products must also possess *luscious, lively flavors* if they are to convert first-time buyers into steady, *repeat* customers for your particular brand . . . FRITZSCHE offers an incomparable selection of fine flavors specially developed for various types of food, beverage and dessert products . . . also the experience and facilities for handling individual flavoring problems that demand special laboratory attention. Remember: *Your product is* ONLY *as good as its* FLAVOR!

For helpful suggestions, direct your special flavoring problems to our Flavor Division, Dept. FE.

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*Fictitious name used to typify over 400 Walworth Distributors

# Here's why it pays to do business with distributors like Mr. Hansen*

**Andy Hansen is typical of Walworth Distributors throughout the nation. He has been a distributor of Walworth Valves and Fittings for years. Like Andy, the Walworth Distributor in your area provides these services and savings:**

He reduces your inventory costs. He's aware of the valve and fitting needs peculiar to his area. He stocks the products that will best serve your needs. Deliveries are always prompt and economical – emergency orders can generally be delivered within hours.

He offers you application and engineering assistance. His technical experience can be invaluable in solving your particular problems. He has 50,000 Walworth products at his disposal. You can be sure that the items he recommends are exactly right for the job.

He is a double guarantee. His business depends upon providing you with the very finest products and unsurpassed service. Every valve and fitting is backed by his own reputation and that of Walworth – a complete line manufacturer.

There's a Walworth Distributor near you ready to help. Call on him today.

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**valves . . . pipe fittings . . . pipe wrenches**

60 East 42nd Street, New York 17, N. Y.

Walworth Company of Canada, Ltd., Toronto

# KEEPING UP WITH THE FIELD

**"Frozens" Box for Ships**

The rage for "piggy-back" shipping containers has leaped from trains to ships, with installation of Freuhauf Trailer Co. boxes on two Matson Line freighters, plying the San Francisco-Hawaii run. The frozen food carriers (four to a ship) are chilled by 5-hp. electric units. And each ship will carry 144,000 lb. of frozens per trip. The boxes are designed for semi-permanent installation on the main deck.

## Releases '54 Fish Figures

Latest complete figures from Fish & Wildlife Service reveal that value of the 1954 fish pack was about $664,000,000—up 13% over '53.

Of the total value, canned products accounted for 50%, packaged fish and shellfish 33%, cured fish 5%, and byproducts 12%.

## Food Films from Fats

Nongreasy, waxlike films—believed to have great possibilities for food packaging—can now be created from acetostearins, report researchers from USDA's Southern Utilization Research Branch (SURB), New Orleans.

The new coatings, made from modified fats, show high resistance to penetration by carbon dioxide, nitrogen, and oxygen—prime requirements of a good packaging material.

## Enzyme Mixture Protects Mayonnaise Color, Flavor

Shelf-life of mayonnaise—which hinges on the prevention of oxidative flavor changes and the stabilization of color—is greatly lengthened by a newly-discovered use of enzymes, reports J. Bloom and G. Scofield of Continental Coffee Co., and D. Scott, Fermco Chemicals, Inc., Chicago.

Using a glucose oxidase-catalase preparation (Fermcozyme) the researchers discovered that 50 ppm. will (1) completely remove free oxygen in the mayonnaise, (2) maintain the desirable deep-yellow color, and (3) protect fresh flavor for at least six months (test period).

Furthermore, the study revealed that standard metal closures—containing wax, pulp, and oil-type linings—are not satisfactory for complete exclusion of air. Test results, with enzyme concentrations as high as 1,000 ppm., were very erratic after only 3-mo. storage.

However, when new tests were run—using caps with Saran liners—50 ppm. gave adequate protection to the food product.

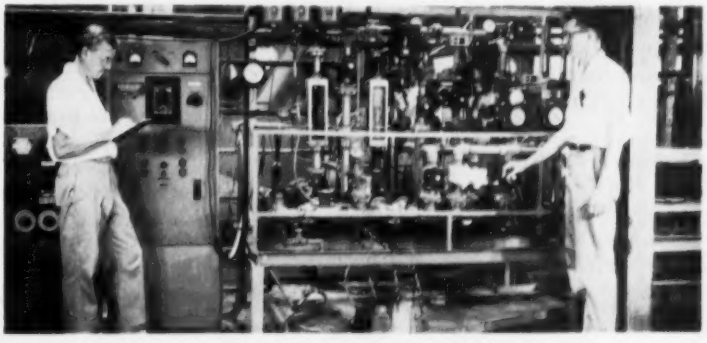
Although present Standards of Identity for mayonnaise do not permit addition of enzymes, the researchers see no difficulty in getting a revision. For, they point out that this enzyme preparation has been an accepted ingredient in manufacture of egg solids for several years.

## USDA Counters Labor Union With Facts on Inspection

USDA is fighting back at labor union pressure for legislation to transfer Federal poultry inspection from the Department to FDA.

Agriculture's publicity machinery, grinding on behalf of the Department's voluntary poultry grading and inspection program, recently called attention to a sharp increase in the number of processors using this service.

Latest move in the campaign is distribution of thousands of copies of a new, six-page pamphlet, "*USDA Poultry Inspection—A Consumer's Safeguard.*" The leaflet explains importance of the "inspected for wholesomeness" mark and the combined inspection and grade label insignia; adds tips on buying and using poultry, classes of poultry, suggested cooking methods, and how much to buy per serving.



**Electro-Desalting of Sugar Juice Termed 'Efficient'**

A new electrodialysis process for desalting sugar juices has been hailed as "quite efficient" by Hawaiian Sugar Planters Assn. (HSPA). The organization declined to be more specific, but declared that pilot tests will be resumed during the coming 1957 season at Hawaiian Commercial & Sugar Co. The process consists of passing sugar juice through a series of thin membranes, placed in an electrical field. Non-sugar salts, attracted by electrodes, pass through membranes and are washed away. Shown at the controls (above) are Dr. J. H. Payne, HSPA researcher, and Dr. E. A. Mason, of Ionics Inc. (makers of the equipment).

# THESE '57 CHEVIES TURNED THE TOUGH ALCAN HIGHWAY INTO A TURNPIKE!

They took the "teeth" out of North America's toughest truck run in an amazing display of stamina and dependability! The Chevrolet Alcan test called for great truck components . . . and here they are, the same modern features you'll get in *your* '57 Chevy!

*Modern high-compression 6's*—a time-proved Chevrolet truck Thriftmaster 6 made the tortuous Alcan Highway test look easy . . . registered a high 18.17 miles per gallon!

*Short-stroke V8 power*—with the shortest stroke of any truck V8's, new Chevy engines stand first in their field for efficient load-pulling! Their great performance in Alaska proved it.

*Safe, sure brakes now Alcan proved*—in light- and medium-duty models, Hydrovac power brakes* supplied up to 85% of the braking effort!

*Unit-design cab and body construction*—Chevrolet truck cabs and bodies remained tight and solid on Alcan bumps, showed that they're built to *last!*

*Rugged Synchro-Mesh manual transmissions*—they displayed never-say-die durability . . . came through with smooth, flexible, trouble-free performance!

*Easy-going Hydra-Matic transmission**—it reduced driver's work immeasurably and it saved wear on drive-line parts, too!

*Sturdy frames and long-leaf springs*—these brawny chassis components proved they can take it when the going is roughest . . . took the Alcan's worst with strength to spare!

These Alcan-proved Task-Force 57 features and others like them (such as extra-heavy rear axles, easy-rolling Ball-Gear steering, and new, improved tubeless tires) are ready to tame your tough truck runs too! Boost your hauling profits by seeing your Chevrolet dealer soon! . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

**Optional at extra cost.*

## 1957 CHEVROLET TASK·FORCE TRUCKS

**PROVED ON THE ALCAN HIGHWAY . . . CHAMPS OF EVERY WEIGHT CLASS!** CHEVROLET

## New Fruit Powders in India

New process for production of powdered fruit-juices from mangoes, oranges, and papayas has been developed at the Central Food Technological Research Institute, Mysore, India.

With the new method, pretreated juices are concentrated, mixed with powdered sugar, fortified where necessary with vitamins, and dried in ordinary cabinet or vacuum driers. No information has been obtained on whether or not the method differs radically from similar techniques worked out in the U. S.

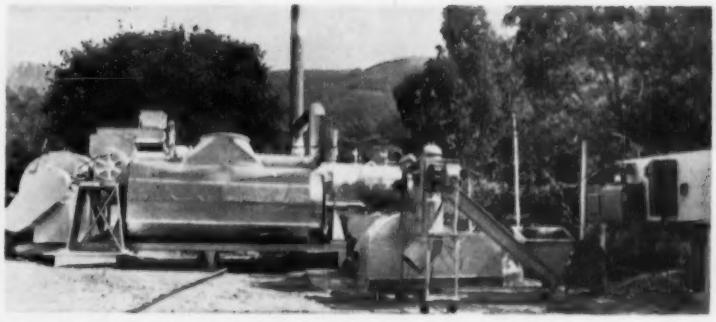
## Italy's Tomato Exports Up

Shipment of tomato products from Italy is on the increase, as revealed by figures for the first six months of 1956.

Exports of tomato derivatives, such as paste and peeled tomatoes, hit 71,359 tons over these months—as against 52,664 tons for the same period in '55.

**"Sister Susie" Sips Milk**

Latest convenience foods pose quality control problems never dreamed of before. To standardize taste in new, flavored drinking straws (Flav-R Straws, Inc.), a special apparatus has been devised from an automatic, intermittent pipette. Dubbed "Sister Susie" by the manufacturer (Food Research Labs, Inc.), the instrument sips a glass of milk in 3 min. and permits samples to be drawn off at any stage for analysis.



**New Machine 'Revolutionizes' Coconut Processing**

Production of edible oil and fine flour from fresh coconuts—right where they're grown—is now possible with a new portable machine, developed by Stanley Hiller, Sr., a San Francisco consulting engineer. Manufacturing rights have been turned over to the Philippine government. President Ramon Magsaysay states that the unit will revolutionize the coconut industry, mainstay of his country's economy. The 30-ton machine takes fresh coconut meat in at one end (at 3,000-4,000 coconuts/hrs.). And after slicing, drying, pressing, and grinding it, discharges a stream of high grade oil and flour from the other end.

## New Esters for Food Use

A new class of non-ionic chemicals, the sucrose esters, soon may find many uses in the food field. Emulsifying such products as chocolate and ice cream will probably be the first job for these compounds. But they are also expected to capture a slice of the huge detergent market.

The chemicals are formed by combining sucrose with an organic acid. And if commercial tallowate is used as the acid, raw material costs are low. Esters tailored for a specific purpose—and made from pure acids—will run high. But in either case the versatile compounds are edible—a fact that should speed FDA approval for their use in foods.

## Bids to Run Atom Center

With its radiation center now in preliminary design stage, the Army is looking for a civilian group to run the facility.

And since preservation of meats will be a prime objective at the 1,000-ton-per-month pilot plant, a meat processor must be one of the operators, rules the Quartermaster Research & Development Command.

Bids are being sent to single firms, syndicates, and other groups who indicated their interest in the project by a Dec. 14, 1956 deadline. The winner will help plan the installation, to be located at Lathrop, Calif., then will take over full operation of a 15-megowatt nuclear reactor and a 20,000,000-volt electron accelerator.

## Switches Package Ratings

New methods for rating packages, based on specific packaging techniques and broad marketing considerations, are being used to judge entries in the 1956 Awards Competition, sponsored by the Package Designers Council.

Experts in packaging and marketing will eye the containers according to the following criteria: Design, construction, merchandising effectiveness, and consumer appeal.

Then, outstanding packages in each of these areas will be reevaluated to determine total appeal—aesthetic, functional, and structural.

## Grocery Men Elect

President of the Grocery Manufacturers of America, Paul S. Willis, was voted in for his twenty-second straight term at the Association's recent annual meeting.

First vice-president is W. S. Shafer, Armour & Co., while D. F. Gerber and W. L. Sims, II, are second and third vice-presidents, respectively. Other officers: F. W. Plowman, Scott Paper Co., secretary, and B. E. Snyder, R. B. Davis Co., reelected treasurer.

**Sea Yields Old Beer Bottles**

Durability of glass bottles is hailed by Glass Container Mfrs. Institute, Inc., with the discovery of 18 old beer flasks —thrown up on a British beach after lying under water for 250 years. Some of the bottles, still tightly sealed, contained an ale that modern British tasters described as "strong".

## MIF Membership Up

A boost in membership to 1,602 companies—representing well over half the U. S. fluid milk business—marks the start of the Milk Industry Foundation's 49th year, according to R. J. Werner, executive director of the organization.

He added that the Foundation has many other members in Puerto Rico, Hawaii, and also in twelve foreign countries.

## Wins Management Award

Efficiency in the production and sales of 250 food products has won an excellent management rating for National Biscuit Co. from American Institute of Management.

Nabisco products fan out from 44 bakeries and 248 distributing points, staffed by 26,000 workers and located in five countries.

## Researchers Win Awards

Discovery that a waxy, rice flour can prevent gravy curdling in pre-cooked frozen foods has won Superior Service Awards for six researchers at USDA's WURB, Albany, Calif.

The studies, completed two years ago, showed that several foods tending to separate—such as pre-cooked frozen puddings, sauces, soups, and pies—were improved by use of the special ingredient. The flour is made from mochi-gome, a waxy rice used by orientals for ceremonial rice cakes.

# BRIEFLY

**• LYSINE, an essential amino acid in human nutrition, will be produced by Chas. Pfizer & Co., Inc., in a patented fermentation method in the form of L-lysine monohydrochloride.**

• PACKAGING RESEARCH has received a boost with announcement of a new graduate assistantship at Michigan State U., sponsored by *Modern Packaging* magazine.

**• TUNA FISH from the Gulf of Mexico will be packed in volume for the first time as two Mississippi canneries start packing a total of 2,500 cases per week. The Gulf-caught yellow fin tuna is being put up at Bluff Creek Canning Co., Vancleave, and DeJean Packing Co., Biloxi.**

• PAPRIKA OIL from domestically grown pods is the new product of Standardized Products Co., Santa Ana, Calif.

• PINEAPPLE JUICE frozen concentrate production will be doubled by Hawaiian Pineapple Co., Ltd. with installation of new equipment, scheduled to be completed in June '57.

**• CALIFORNIA PROCESSORS who use electronic computers to solve their knotty problems have a new facility in Los Angeles. Electronics Assoc., Inc., has opened a large analog computer center, staffed with experienced engineers, that can be used on an hourly-rental basis.**

• CANNING FIELD is the third largest user of steel, according to Canning Machinery & Suppliers Assn. Shipments in '55 for machines, and packaging, and other uses hit almost 7,000,000 tons—exceeded only by automotive and construction industries.

**Plans $3,500,000 Center**

New headquarters for International Minerals & Chemical Corp. will be located in Skokie, Ill. The firm, which manufactures industrial chemicals and a food flavor intensifier (Ac'cent), is investing $3,500,000 in three buildings. The structures (120,000 sq. ft.) will house administrative, staff operating divisions and electronic services.

## Action on Standards

Following actions have been taken by the Agricultural Marketing Service (AMS) and Food & Drug Administration (FDA) on U. S. Standards and allowable tolerances of various pesticides on raw agricultural commodities. References are to *Federal Register*.

*Okra, canned*, AMS proposed revision U. S. Standards, *F. R.*, Nov. 21, p. 9066.

## Schedule of Events

**January '57**

20-24—National Potato Chip Institute, annual conference; Statler-Hilton Hotel, Dallas, Tex.

21-24—National Macaroni Manufacturers Assn., annual meeting; Flamingo Hotel, Miami Beach, Fla.

23-25—Southeastern Symposium on Industrial Instrumentation, annual conference; U. of Florida, Gainsville.

28-30—Canadian Food Processors Assn., annual convention; Seigniory Club, Montebello, P. Q.

28-31—Plant Maintenance & Engineering Show; Public Auditorium, Cleveland.

31-F1—National Wooden Box Assn., annual meeting; Boca Raton Hotel, Boca Raton, Fla.

30-F2—American Dehydrators Assn.; Edgewater Gulf Hotel, Edgewater Park, Miss.

**February**

4- 6—Fieldman & Processor's Conference; Kellogg Center, Michigan State U., E. Lansing.

14—Dairy Products Improvement Institute, annual meeting; Statler Hotel, New York City.

15-16—National Preservers Assn., annual convention; Morrison Hotel, Chicago.

15-17—Institute of American Poultry Industries, annual conference; Municipal Auditorium, Kansas City, Mo.

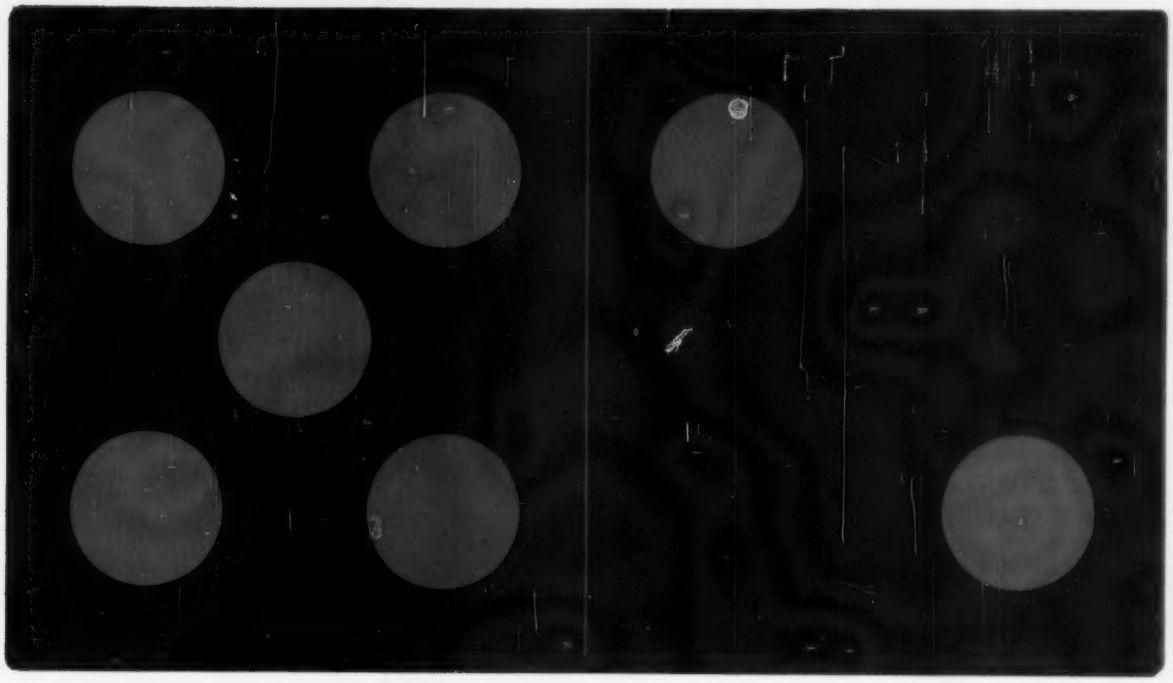
16-20—National Canners Assn., Canning Machinery and Suppliers Assn., overall convention and exposition; Conrad Hilton Hotel, Chicago.

23-28—U. S. Brewers Foundation, annual convention; Fairmont and Mark Hopkins Hotels, San Francisco.

26-27—National Dairy Engineering Conference; Kellogg Center, Michigan State U., E. Lansing.

25-M1—American Society of Heating & Air-Conditioning Engineers, annual convention and exposition; International Amphitheatre, Chicago.

# SPECIAL STARCHES



## for canned foods with 7 NEW FEATURES

These are unique effects. Seven of them. For any canned food that requires thickening. All possible—and practical—when you use National's Special Starches:

- Natural color
- Full flavor
- Smooth creamy flow
- Uniform viscosity from cooking to serving
- Shelf life stability
- Dispersibility with added liquids
- Breakdown resistance under retort conditions

We'd like to demonstrate these seven new features. By selecting a Special Starch for each of your canned foods—ranging from soup to dessert. Just write. Or call your nearest National office.

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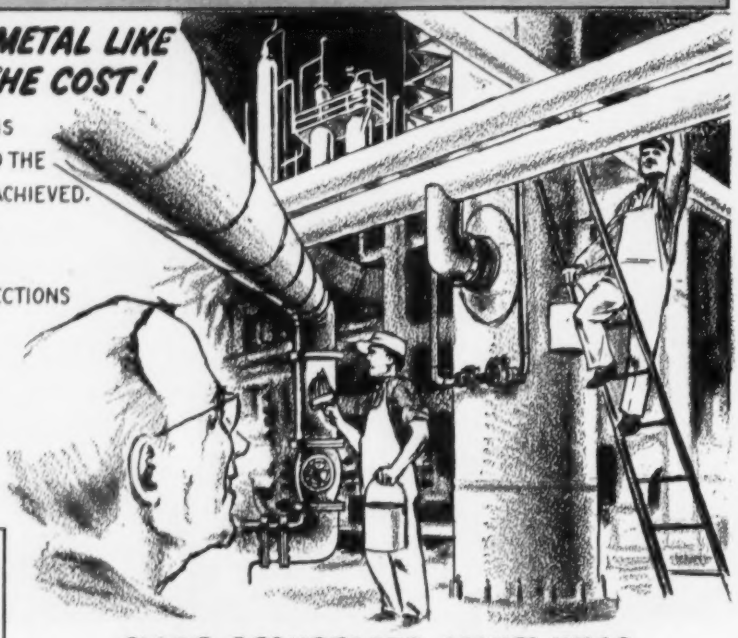
# BELIEVE IT OR NOTS IN INDUSTRIAL COATINGS

## NEW COATING PROTECTS METAL LIKE HOT SPRAYED ZINC AT ⅓ THE COST!

GIVES AN "ON SITE" APPLIED COATING THAT IS CLOSEST APPROACH TO GALVANIZING AND THE FINEST ANTI-CORROSIVE PRIMER EVER ACHIEVED. FIRST EPOXY ZINC RICH COATING WITH OUTSTANDING ADHESION AND 90% ZINC METAL SURFACE DEPOSIT. HIDES IMPERFECTIONS IN CASTINGS. NOTHING ELSE EQUALS IT. EVEN SCRATCHES TO BARE METAL DO NOT RUST DUE TO CATHODIC ACTION. NEUTRALIZES RUST AND MILLSCALE TRACES. THE NAME IS **EPO-LUX-100** ZINC RICH ZINC DUST PRIMER.



SPECIAL SURFACE MAINTENANCE PROBLEMS ARE STEELCOTE'S SPECIALTY, IF YOU WANT TO REDUCE COSTS, CONSULT STEELCOTE'S ENGINEERING DEPARTMENT F. E.

## FLOOR RESURFACER MAKES WOOD OUTWEAR CONCRETE

WHERE HEAVY TRUCKING, ACIDS, SALT OR ALKALI DESTROY WALLS, WOOD, CONCRETE FLOORS, OR GROUT BETWEEN TILE, **FLOOR-NU** SOLVES THE PROBLEM. MAKES A TIGHT BOND PATCH OR IT CAN BE LAID ⅛" THICK OVER ENTIRE FLOOR. NO SHRINKAGE. READY TO APPLY WITH TROWEL. CAN BE TRUCKED OVER IN 30 MINUTES. NO NEED TO MOVE OR HAUL MATERIALS. HARDER, STRONGER, MORE ADHESIVE THAN CONCRETE. NEW AND ENTIRELY DIFFERENT.

## BOAT BOTTOMS GO FOR YEARS WITHOUT PAINT OR REPAIRS

THE NEW **EPO-LUX 100-185** SYSTEM MAKES BOAT BOTTOMS 8 TO 10 TIMES TOUGHER THAN HERETOFORE. WOOD, PLASTIC OR METAL HULLS REQUIRE NO PAINTING OR REPAIRING FOR YEARS. FASTER AND SIMPLER THAN PREVIOUS SYSTEMS.

*OFFICES, DISTRIBUTORS IN PRINCIPAL CITIES*

## THIOCAULK STICKS TIGHTER, LONGER THAN ANY OTHER TYPE CAULK

THIS CAULK NEVER HARDENS. UNAFFECTED BY TEMPERATURES FROM 65° BELOW ZERO TO 265° ABOVE. HAS 48 TIMES THE ADHESION OF REGULAR CAULK. IDEAL FOR NEW CURTAIN-WALL CONSTRUCTION TO SEAL OUT CLIMATE. DOES A PERMANENT CAULKING JOB IN NEW OR OLD BUILDINGS WITH CONSEQUENT REDUCTION IN COST.

THERE ARE MORE THAN 100 PRODUCTS MADE BY

**Steelcote**

3418 Gratiot St., St. Louis 3, Mo.

*Grapefruit juice, frozen concentrate*, AMS establishment of U. S. Standards, *F. R.*, Nov. 28, p. 9284.

*Poultry & edible products thereof*, AMS proposed amendment to U. S. Standards, *F. R.*, Nov. 29, p. 9326.

*Wheat*, AMS proposed revision of U. S. standards, *F. R.*, Dec. 1, p. 9432.

*Tomatoes, fresh*, AMS establishment of U. S. Standards, *F. R.*, Dec. 4, p. 9558.

*On fat of cattle, Sheep, and hogs*, proposed establishment of tolerances for DDT, *F. R.*, Nov. 17, p. 8980.

*On asparagus, barley, blackberries, boysenberries, carrots, collards, corn, currants, dandelions, dewberries, endive, figs, garlic, gooseberries, guavas, horseradish, kohlrabi, leeks, loganberries, mushrooms, nectarines, oats, parsley, parsnips, pecans, peppermint, pumpkins, quinces, radishes, raspberries, rice, rye, salsify, shallots, spearmint, swiss chard, water cress, walnuts, wheat, meat, chicken eggs, and milk*, withdrawal of petition for tolerances of Malathion, *F. R.*, Nov. 28, p. 9299.

*On spices, buckwheat, oats, and sorghum*, proposed tolerance for hydrogen cyanide, *F. R.*, Dec. 4, p. 9582.

## Most From Lift-Trucks

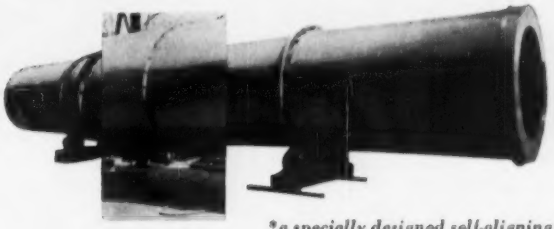
—*Continued from page 90*

should refuel only in an outside location with the engine off. The truck should stand 15 min. if excessive gas spillage has occurred. Flammable liquids and acids should be transported only in approved containers. Drivers should see that fire extinguishers are periodically inspected and charged, and above all make certain that their extinguishers are of the correct type.

Inspection frequency, and items to be included in the various inspections, will differ from firm to firm. Some of the factors determining inspection frequency are: Surface over which the trucks operate, size and type of loads, atmospheric conditions including temperature and dust, whether the service cycle consists of long or short hauls, amount of jockeying, actual hours under load, and whether the truck is assigned to one or several operators.

Maintenance on equipment driven in dust laden atmospheres requires special attention. First and foremost is the importance of greater frequency—sometimes as often as every 15 to 20 hr. Gas trucks should be equipped with a pre-air cleaner to


**Another example of STANDARD-HERSEY leadership!**



**a specially designed self-aligning joint flange was developed which permitted the dryer to be installed in an "inaccessible" location.*

It's more than Standard Steel's routine of good design, quality materials and skilled workmanship that sells *Standard-Hersey* dryers...often it's the unusual engineering *ability to solve a difficult problem.* Time and time again new and old customers alike come to Standard Steel.

For more than 50 years, Standard Steel has developed dryers for many segments of American industry... handling difficult drying jobs with trouble-free, efficient and economical service.

No matter the drying job...nor how difficult the problem,

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PILOT TESTING

**LA PORTE**

***moves food up · down · horizontally***

**You can handle every food conveying operation,** from loading hopper to shipping dock, with this versatile, sanitary belt that is quickly and easily converted for flight conveying by attaching the La Porte cleat.

***The steel mesh feature*** allows circulation of air and liquids around products in process; also facilitates cleaning and sterilizing with steam gun or hot water. La Porte belting will not weave, creep nor jump. Its rugged construction assures long, economical service and low maintenance costs.

Available in any length and practically any width.

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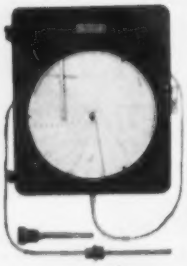
**BOX 124** — ***La Porte, Indiana***

**4½" DIAL THERMOMETERS**

Made in 3 types to suit any requirements. Rigid stem, wall or flush mounted, 11 inches of scale reading. Interchangeable with standard industrial separable sockets. Stem can be placed at any angle and case can be rotated to any readable position.

**PALMER**
MERCURY ACTUATED
Temperature Indicating
Instruments

**RECORDING THERMOMETERS**



Twelve inch die-cast aluminum case with black or white wrinkle or satin finish. Single or multiple pen construction. Electric or spring wound clock, 24 hour or 7 Day Revolution. Flexible Armor and bulb of stainless steel. Ranges —40 +950°F or Equivalent in °C.

**INDUSTRIAL THERMOMETERS**

Red-Reading Mercury —Extruded brass case — chrome finish. Ranges —40 + 950°F or Equivalent in °C.

**RED-READING MERCURY LABORATORY THERMOMETERS**

Thoroughly annealed for permanent accuracy. Complete line A.S.T.M. and fractional division types.

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filter out the heavier particles before they can get into the oil bath cleaner.

There are some additional requirements for operating in cold storage spaces. Special hydraulic oil and low-temperature lubricants should be used. All nuts and bolts should be cadmium plated. On lift and tilt cylinders, rods should be of stainless steel. Since contacts and switches vary from manufacturer's make and model, it's sometimes advisable to put on heavier return springs.

On electric trucks required to operate continuously in extremely cold temperatures, it is wise to enclose contactors and controllers in much the same way as on a spark-enclosed machine. Heating equipment is then installed around the master directional and limit switches.

A road test, under capacity load, wherein the truck and lift-tilt mechanisms are put through their paces by a competent mechanic—with this check coupled with a thorough visual examination of the upper and under sides for apparent wear, leaks, cracks, and damage—is the most efficient method for determining which items demand immediate and thorough attention. Finally this good rule of thumb: "If you can see it, inspect it."

*End (Resume reading on page 93)*

## Lightweight Cooling Unit

*—Continued from page 99*

Co., and Fruit Industries, a Florida frozen orange juice processor.

The units may be installed in straight trucks which have space above the cab. Models will be available for panel trucks or Vanette-type bodies.

The units are offered in two styles: A straight hydraulic drive; and a combination hydraulic drive and standby electric drive. All models come with either manual or automatic defrost.

The refrigerating unit itself consists of two sections separated by an insulated heat shield. The condenser coil, fan, compressor, hydraulic motor, and controls are in the front section. In the model with standby electric drive, these components are also placed in the front.

The rear section, fitted into the truck body, holds the evaporator.

The unit is fastened to the truck with four bolts, and is readily removed or changed. Weight runs as low as 455 lb.

The hydraulic pump may be driven by double belts and pulleys off the crankshaft or from a power take-off on the truck gearset or transmission.

### Maintaining Compressor Speed

Regardless of the method of power capture, the problem is to maintain a constant compressor speed despite varying engine rpm. In the Thermo-King unit, this has been accomplished by means of a "wobble plate" in the hydraulic pump. This automatically meters the flow of oil to provide a predetermined amount at all speeds from idling to full.

On the "off cycle", or when the temperature in the body has reached the point at which the thermostat has been set, a solenoid control valve is energized to throw the "wobble plate" into a neutral position with no pumping action. When temperature rises again, the solenoid is de-energized and refrigeration is resumed.

Automatic defrosting is accomplished by an electric timer. After every 4½ hr. of unit running time, the defrost cycle is initiated. If defrosting is not required, the unit will automatically revert to the regular refrigerating cycle.

*End (Resume reading on page 101)*


**STEEL**

***Every Kind***

***Quick Delivery***

**Plates, Structurals, Bars, Sheets, Tubes, etc. Carbon, Alloy, Stainless Steels, Babbitt Metal.**

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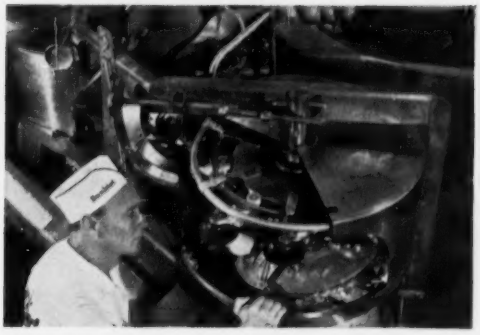
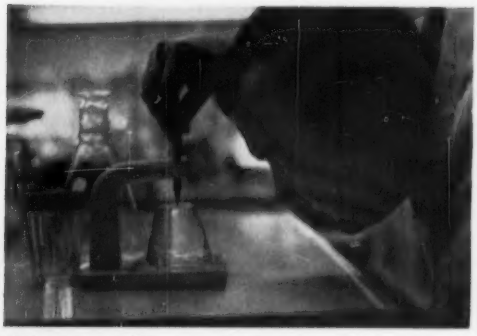
**One look** at the huge, sprawling buildings at one of the Exchange Products plants and you know that big things are happening inside. For here *citrus* is king. Trucks pour in with fresh fruit from groves all over California and Arizona. Conveyer belts hum along in every direction. And Exchange products are shipped to nearly every part of the world.

# Why 'Exchange' products serve you better



**Utmost cleanliness** is the watchword at Exchange Products plants. Everything has that "just washed-down" look. Every four hours, extraction equipment is completely cleaned. Every third day, the entire plant closes down for a thorough washing.



**Exchange quality** is assured by constant checking in extensive testing laboratories. In fact, rigid quality controls have been set up *throughout* the plant to make sure that every product measures up to Exchange quality. Sunkist produces more than 400 different citrus products.

**The world's largest** citrus research department is maintained by the Sunkist Growers to develop new growing methods, to improve manufacturing processes, and to perfect better products. Today, with a backlog of more than 60 years experience, Sunkist has accounted for 118 separate U.S. patents.

**Just three** of many Exchange products are *Exchange Preserver's Pectin*—guarantees a more uniform finished product; *Exchange Low Methoxyl Pectin*—jells *without* sugar, tasteless, controls "weeping" in pies; *Exchange Lemon Juice*—brings out natural flavor of *any* food. Superior acidulant, excellent anti-oxidant.

## Sunkist Growers

PRODUCTS DEPARTMENT • ONTARIO, CALIFORNIA

*Distributors for*

Exchange Lemon Products Co., Corona, Calif. • Exchange Orange Products Co., Ontario, Calif.

## Bigger payloads

# One of 9 reasons why fleets find International Trucks cost least to own!

What cuts your hauling cost most? Bigger payload? INTERNATIONAL Trucks have it with lightweight construction wherever practical to let less metal do more work. With models that give you shortest possible BC dimensions.

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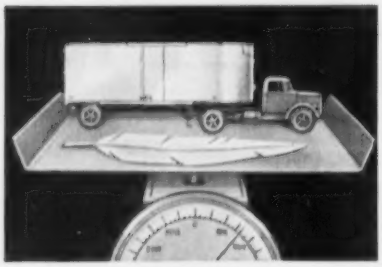
The way to start piling up payloads, and trimming costs, is to talk trucks with your INTERNATIONAL Dealer, today. He's right at the other end of your phone.

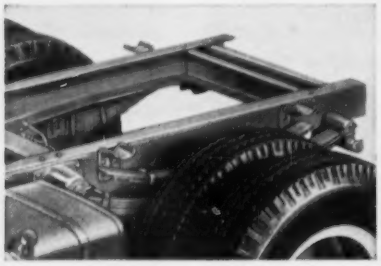
**Signed statements in our files, from fleet operators throughout the U.S., back up this statement.*

INTERNATIONAL HARVESTER COMPANY, CHICAGO

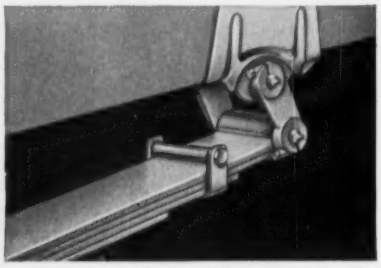
Motor Trucks • Crawler Tractors
Construction Equipment • McCormick® Farm Equipment and Farmall® Tractors



1 **Hundreds of extra payload pounds** are yours with lightweight construction that makes less metal do more work. Models available with aluminum frame and other weight-saving components. Space Saver cab for still more payload.

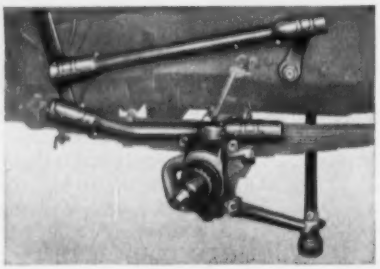


2 **Rugged frame** has plenty of sturdy crossmembers. Non-crystallizing, cold squeezed rivets are used for extra rigidity and proper flexibility on all types of service. Husky front and rear sections add to the safety margin built into every frame.

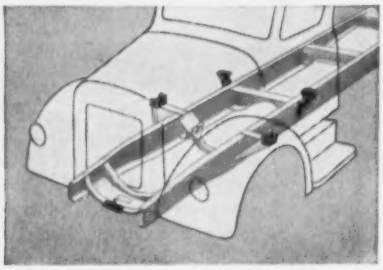


3 **Cradle action front and rear springs** cushion load and driver. Proper design and mounting provide better load support, smoother riding and longer spring life. Rear-shackled front springs for greater stability and increased life.

4 **Full air brakes** are standard or available on most models with lining areas to match the model, load and operating conditions. Twin-cylinder self-centering, self-energizing hydraulic brakes provide safer, easier stops and longer life.

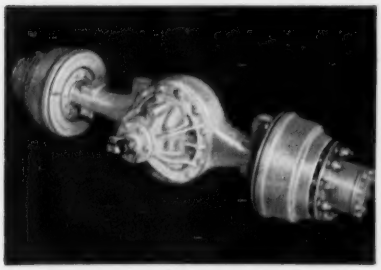


5 **Safer, easier steering** and greater maneuverability result from cam and twin lever gears with controls mounted *ahead* of front axle. Steering wheel is comfortably positioned. Power steering available on most models.

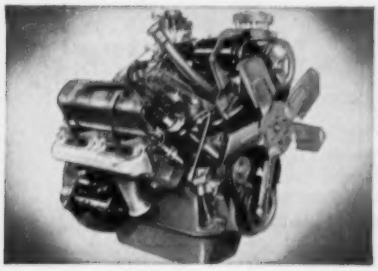


6 **For cab comfort and long life.** Quiet, level ride without transmitting stress to cab, fenders, hood or radiator. It's the result of wide spaced, rear shackle type cab mountings plus exclusive INTERNATIONAL 5-point rubber-insulated suspension.

Only INTERNATIONAL builds tractors exactly right for your over-the-road operation . . ."sized," powered and geared to save you, earn you more money. Roadliner® models have 29,000 lbs. to 76,800 lbs. GCW with engines that produce up to 356 hp., famous sixes and three great new V-8's. Choice of 4-wheel and 6-wheel models, conventional or COE design. You name the job, INTERNATIONAL has the tractor that will do it—profitably.



**7 International rear axles** and transmissions are offered in hundreds of variations to provide the right capacity and proper final drive ratios for every hauling job . . . a matched combination that reduces road time and operating costs.



**8 Most powerful, most economical V-8's** under any truck hood—206, 226 and 257 hp. for faster acceleration and higher average road speeds with less shifting. More miles per gallon of gasoline. Other gasoline, LPG and diesel engines up to 356 hp.

**9 World's most complete line.** There is an INTERNATIONAL "tailor-made" for every truck job, ½ tonners to 90,000 pounders. Choice of 4-wheel, 6-wheel and all-wheel-drive models, conventional and COE design. Every one built to cost *least* to own.



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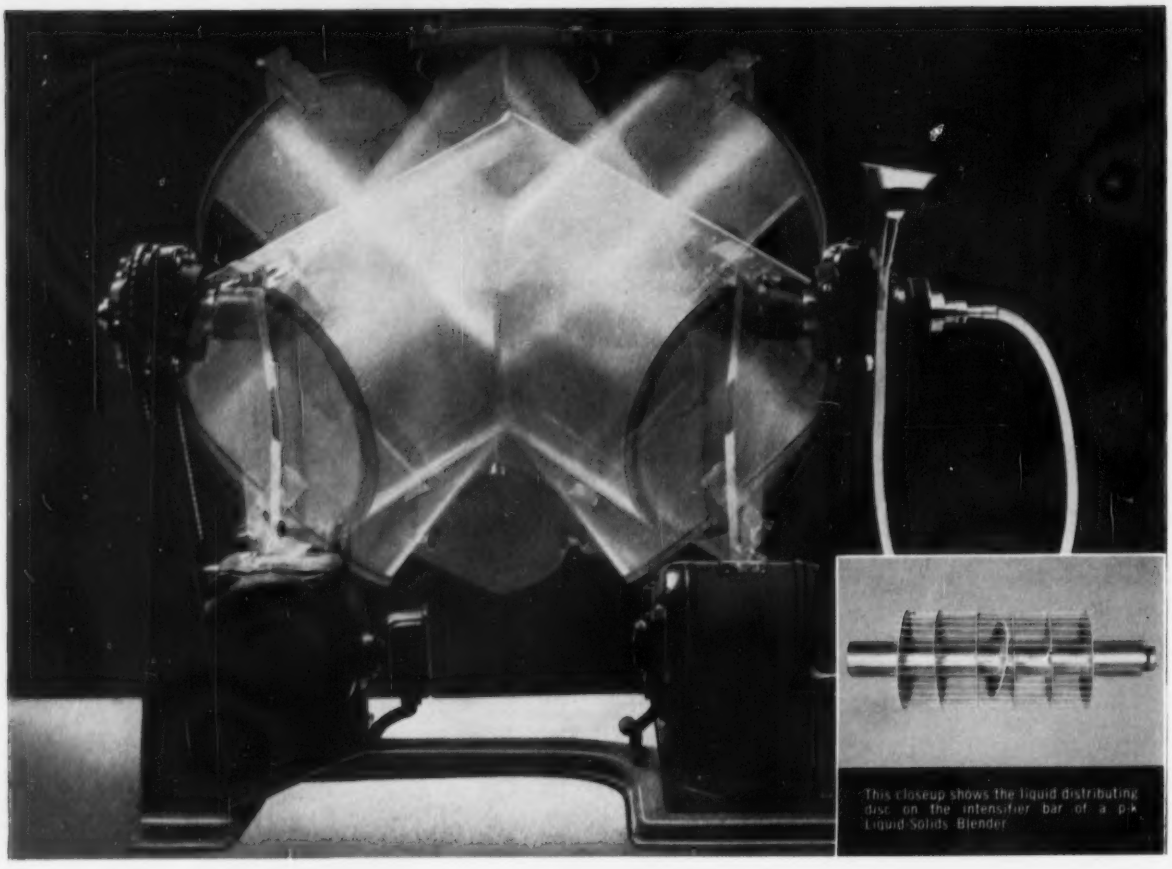

This closeup shows the liquid distributing disc on the intensifier bar of a p-k Liquid-Solids Blender

# P-K Liquid-Solids* Blender Creates New Production Concept!

A new, revolutionary method for blending liquids into dry materials is highly successful in practically all chemical and process applications.

Essentially, the p-k Liquid-Solids blender operates in the following manner. Liquids, regardless of viscosity, are introduced into a rapidly revolving bar (by gravity or pump). The liquid is flung outward in a finely divided state from a distributor disc and feeds a continuous fine spray into the tumbling mass of dry materials as the shell rotates. A series of stainless steel wires, strung horizontally along the bar, prevents the formation of agglomerates and further promotes liquid dispersion.

This unique blending operation can be accomplished in *minutes* and eliminates costly, time consuming steps, such as screening, pulverizing and mulling. With the p-k Liquid-Solids blender, you will get a fast, one step operation that guarantees *consistent* blending *uniformity* not otherwise obtainable.

The exclusive p-k dry mechanical seal prevents materials from entering the bearing housing and protects against product contamination. Two vapor and dust-tight quick-opening covers allow easy access to the baffle-free interior for cleaning. The p-k Liquid-Solids blender is available in sizes ranging from 1 to 50 cubic feet working capacity.

*Patented and Patents Pending

**Patterson Kelley**
Chemical and Process Division

P-K Twin Shell Blenders* • Heat Exchangers • Packaged Pilot Plants • P-K Lever-Lock Doors*

## Investigate P-K's Blending Concept

P-K's Customer Service Laboratory will be pleased to test-blend your materials . . . preferably under your supervision. Material formulations will be blended to your exact specifications and returned for analysis, together with a complete report. P-K recommends pre-tests for all "Liquid-Solids" applications, because of the many variables that may affect blending procedures necessary for intimate dispersion of liquids in solids. Our Lab also conducts comparison tests in pilot models of all other basic blender types . . . from ribbon and double cone to p-k's standard Twin Shell and "Intensifier" models.

All of them are members of a growing family of p-k blenders and all are described in our new catalog 14. Write our Mr. R. T. Dotter for your copy . . . and arrange, too, for a pre-test of your materials.

**The Patterson-Kelley Co., Inc., 1510 Hanson St., East Stroudsburg, Pa.**



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# MEN & COMPANIES

## Industry

**Butoni Foods Corp.**, South Hackensack, N. J., reports the establishment of a new division—Butoni Foods of Florida, Inc.—with headquarters in Miami.

**Consolidated Foods Corp.** has announced the sale of Rosenberg Bros. & Co's. rice operation to Rice Growers Assn. of Calif. for $4,250,000.

**Carling Brewing Co.** has purchased a 450,000 barrel-a-year Frankenmuth, Mich., brewery from International Breweries, Inc., Detroit.

**Green Giant Co.**, Le Sueur, Minn., reveals that it will spend $2½ million to establish a new can-manufacturing operation in Minn.

**Pepsi-Cola Co.** has opened a bottling plant in Ixtepec, Mexico, its thirtieth plant in that country.

**Shirriff-Horsey Corp., Ltd.**, has purchased a substantial stock interest in Green Giant Canada, Ltd. W. F. Dietrich, president of Green Giant Co. (Le Sueur), is new chairman of board, and W. Brant Horsey is new senior v.-p.

**Strong-Scott Mfg. Co.**, Minneapolis, has established a customers' service laboratory specifically designed to furnish food processors and other researchers in industry with assistance in solving grinding, mixing, and separating problems.

**William-McWilliams Industries, Inc.**, announces the acquisition of business of Merkel, Inc.

## Personnel

**Charles Adams, William Pratt, Robert Zinn, Jr.,** and **Leon Gottlieb** have been elected president, 1st v.-p., 2nd v.-p. and secretary-treasurer of Frozen Food Council of Southern Calif. for the coming year.

**O. Lester Applegate** has been elected v.-p. in charge of engineering for Standard Brands Inc.

**Earle L. Johnson** announces his coming retirement as v.-p. in charge of marketing for Gerber Baby Foods, division of Gerber Products Co., Freemont, Mich. He will be succeeded by Joseph H. Begley.

**Paul S. Armstrong,** general manager Sunkist Growers for 25 yr., announces his retirement. F. R. Wilcox, D. M. Anderson, and M. D. Street have been elevated to the posts of general manager, assistant general manager and secretary, and treasurer, respectively.

**L. D. Ballew** is newly named director of marketing and sales for Regal Pale Brewing Co., San Francisco.

**Joseph A. Braun** has been elected to the board of McCormick & Co.

**Frederick E. Brewster** and **Edwin G. Hufnagel** have been appointed to the board of Burry Biscuit Corp., Elizabeth, N. J.

**Frank Britton,** head of engineering department of Libby, McNeill & Libby, Chicago, has retired.

**John Bouton** is new director of flavor department for Dodge & Olcott, Inc., New York City.

**Dr. D. M. Doty** is newly elected chairman of American Chemical Society's division of agriculture and food chemistry for 1957.

**E. B. Cosgrove,** board chairman of Green Giant Co., Le Sueur, Minn., has been named "Minnesota Canner of Distinction" by the Minnesota Canners and Freezers Assn.

*Installation of RCA Metal Detector in a well-known candy plant.*

is there a "cop" at your conveyor?

Through the use of the RCA Metal Detector, steel slivers have been found in prepared meats, crackers and pies, staples in candy, a shoelace tip was found in coffee, a shredder blade in a cigarette. These are all potential causes of legal action and all food manufacturers are vulnerable. For your own defense, be able to produce evidence that you not only use "due care," but a "very high degree" of care. To "police" your conveyors you need the RCA Electronic Metal Detector for positive automatic action. Overall plant operation is improved—the savings usually quickly pay for the installation.

**RADIO CORPORATION of AMERICA**
Dept. N-198, Building 15-1, Camden, N. Y.
In Canada: RCA VICTOR Company Limited, Montreal

☐ Please send me complete information on RCA Metal Detector for use in the food industry.
☐ Have RCA field representative contact me.

NAME_____ TITLE_____
COMPANY_____
ADDRESS_____
CITY_____ ZONE____ STATE_____

Famous for protection ...

*The long-lasting film of--*

**ORANGE SOLID OIL**

*--is famous for protecting machinery*

***Lasts two to four times as long as ordinary greases.***

***Saves bearings, material, power, time...and...labor.***

***Keeps production--UP! Maintenance repairs--DOWN!***

Like the tough protective hide of the alligator--the long-lasting, super lubricating film provided by Orange Solid Oil is famous for protecting machinery. Not only does it do a more efficient lubricating job--but it stays on the job four times longer. That's why it is used and recommended by the largest manufacturers of dairy, creamery, ice cream, and cheese machinery and equipment.

*1--Pure, unadulterated petroleum solidified oil*
*2--Practically odorless, tasteless, and transparent*
*3--Will not turn rancid--free of animal and vegetable fats*
*4--Cannot pit bearings--contains no alkalis*
*5--Non-corrosive--will not gum, cake, dry, or harden*
*6--Contains no fillers or abrasive of any kind*
*7--For use in all Alemite and Zerk fittings, and grease cups.*

For positive lubrication protection--use Orange Solid Oil. It will help you minimize production shut-downs...reduce maintenance costs...and...keep your output high.

Over 200 leading distributors from Maine to California stock Orange Solid Oil. It is packed in 4 oz. tubes...and...1, 10, 25, 100, 225, and 375 pound containers. Quick delivery from your local distributor. If he can't fill your order--phone, wire, or write for name and address of your nearest source of supply.

**For additional protection use special purpose--**
**ORANGE HOMOGENIZER OIL NO. 50**
**• Refined from aircraft stock • Does not foam • Moisture resistant • Will not form residues or sludges**

**Famous Lubricants Inc.**
Phone--BOulevard 8-2555
124-132 West 47th Street • Chicago 9, Illinois


**Robert W. Earle** has been elevated to general manager of main processing plant of S&W Fine Foods, Inc., Redwood City, Calif.

**James S. Fish** has been elected v.-p. of General Mills, Inc.

**Jeremiah F. Hourihan** is new general sales manager of Pepsi-Cola Elmira (N. Y.) Bottling Co., Inc.

**M. D. Kastner** is new general sales manager of Borden Co.'s Chicago milk division.

**John A. McClerry,** has been named treasurer of Green Giant of Canada Ltd., Tecumseh, Ont.

**George A. Oman** is new director of production and engineering for Theo. Hamm Brewing Co.

**Henry E. Picard** has been raised to president of San Francisco Brewing Corp., San Francisco.

**G. C. Pound, J. Clyde Loftis,** and **John H. Platt** have been elected board chairman, president, and senior v.-p., respectively, for Kraft Foods Co.

**P. A. Ramey** is new general manager of York Farms Ltd., Ottawa, Canada.

**James E. Stewart** has been appointed plant superintendent of Pabst Brewing Co.'s Los Angeles brewery.

**O. E. Swain** is new general manager of southeastern division of Kraft Foods Co.

**Dr. Bernard S. Schweigert** has been appointed director of research and education of the American Meat Institute Foundation. Drs. Delbert M. Doty and Charles F. Niven are new associate directors.

**Paul W. Thurston** has been elected president of Foote & Jenks, Inc., Jackson, Mich.

**Richard L. Tobin** has been named assistant to president of Campbell Soup Co., Camden, N. J.

**Frank E. Trager** is new v.-p. of Inland Sugar Co., Chicago.

**Florentine Urban** has been re-elected president of Specialty Bakers' Services, Inc., Detroit.

**H. E. Woodford** is newly appointed president of Consolidated Food Processors, Inc., Rivergrove, Ill.

## Associated Industry

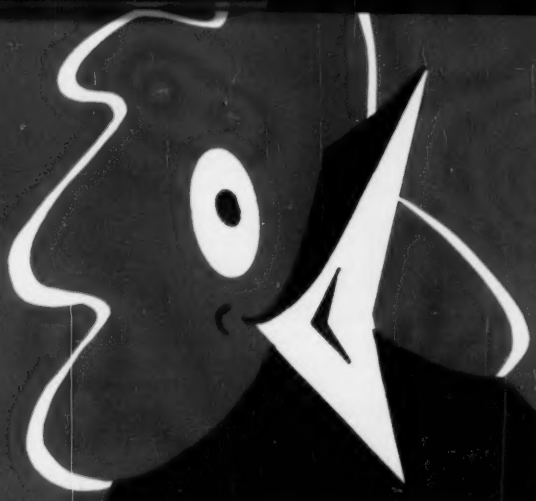
**American Can Co.** is erecting a steelplate and tinplate processing plant at Hammond, Ind., as part of $27 million project to install facilities for processing plate throughout the country. It has also begun expansion programs in two of its East Coast plants, and has completed a major renovation job at a third in Baltimore, Md.

**Assn. of Lift Truck and Portable Elevator Manufacturers** has elected C. E. Klumb secretary and sales manager.

**Archer-Daniels-Midland Co.** has purchased an interest in Scado Kunsthars Industrie, N. V., a leading Holland manufacturer of resins and plasticizers.

**A. W. Cash Co.,** Decatur, Ill., has appointed William Schupner chief engineer for Fluid Power Products.

**Bakelite Co.** announces appointment of Dr. J. F. Eversole as v.-p. in charge of research.



# THERE'S MORE THAN ONE WAY TO SKIN A GIZZARD!

Power Gizzard Skinner Means Better Production for packers! Driven by a Master ¼ H.P. Double Parallel Gearmotor, output speed 230 R.P.M.

## ANOTHER DRIVE REQUIREMENT MEETS ITS MASTER

*"But my drive problems are different," you say, and right you undoubtedly are.* Far as we know, this Master-powered Gizzard Skinner is unique.

But here's the point. America's productive genius consists of the ability to analyze a problem, devise a system and apply power to it in such a way as to produce better results faster at less cost. And *that problem* we bet you've got!

Let us help! Tell us the problem. From the drives listed here—or a combination of the required ones in one compact efficient unit—we'll deliver the goods! That's just what we've done for many, many years, to an ever-enlarging cross-section of American industry jealous of the performance of their motor equipment.

**Motor Ratings**—⅛ to 400 H.P. All phases, voltages and frequencies.

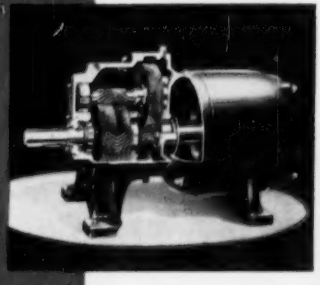
**Motor Types**—Squirrel cage, slip ring, synchronous, repulsion-start induction, capacitor, direct current.

**Construction**—Open, enclosed, splash-proof, fan-cooled, explosion-proof, special purpose.

**Speeds**—Single-speed, multi-speed, and variable speed.

**Installation**—Horizontal and vertical, with or without flanges and other features.

**Power Drive Features**—Electric brakes (2 types)—5 types of gear reduction up to 432 to 1 ratio. Mechanical and electronic variable speed units—fluid drives—every type of mounting.



MASTER

THE ELECTRIC COMPANY

Dayton 1, Ohio

*New markets open, old ones expand, as*

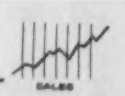
# Mother Nature gets a big assist from Pro-80 Vital Gluten

Mother Nature and modern food processing methods have done wonders to provide healthful, tasty foods.

But many times these foods do not contain enough protein to satisfy increasing numbers of health and diet conscious consumers. That's where Pro-80 Vital Gluten steps in! Added to these foods, Pro-80 raises protein content to satisfy consumer wants, to create new markets, new profits for food processors. It merits your investigation—right now!

*10 quick questions and answers to help you understand the importance of protein enrichment with Pro-80 Vital Gluten*

**WHY SHOULD I CONSIDER PROTEIN ENRICHMENT FOR MY FOODS?**




To keep your products attune to public demand. Customers' wants have changed in recent years. They are more weight, health and diet conscious—They seek protein-rich foods. Foods fortified with Pro-80 can help satisfy their needs—give you premium products that mean new interest in your line, an important "difference" to promote.

**WHAT IS PRO-80?**

Pro-80, a natural product developed through research, is General Mills' high-protein vital wheat gluten: 80+% protein on a moisture-free basis.

**HOW IS IT MADE?**

Pro-80 is made from wheat flour by washing out the starch and drying the gluten in vacuum ovens at low temperature. Thus its vital characteristics are preserved. When reconstituted with water, Pro-80 regains its resilient elasticity.

**WHAT DOES PRO-80 LOOK LIKE?**

Pro-80 is a creamy-tan, dry powder, is easily handled and stored. Standard package is a 100-lb. bag.

**HOW DO YOU USE PRO-80?**

Simply mix Pro-80 with other dry ingredients during processing. It is bland, compatible with other foods, adds no taste or odor of its own—hydrates rapidly, blends smoothly.

**WHAT FOODS ARE EASILY ENRICHED WITH PRO-80?**

Scores of them. Among the most popular are:

breads, baked goods, macaroni products, canned specialties, cereals, baby foods, health foods, medicinal wafers

**WHO BENEFITS FROM PROTEIN FOODS?**

Everyone. Protein foods build and maintain good health. High protein diets are especially recommended for weight reduction, during illness, surgery and pregnancy.

**HOW DOES THE BODY PUT PROTEIN TO USE?**

The body uses protein to build muscle, to replace tissues and to keep them healthy. Protein makes enzymes to aid digestion, builds antibodies and is part of the hemoglobin.

**HOW DOES PRO-80 IMPROVE FOODS?**

By increasing protein content without disturbing other characteristics. Protein ration can be easily adjusted by merely adding specified amounts of Pro-80. In a addition, it improves cohesiveness, often improves flavor, bite and tolerance.

**WHAT DOES IT COST TO ENRICH FOODS WITH PRO-80?**

Relatively little. For example, if your foods now contain as little as 7½ per cent protein, you can increase protein content to more than 11 per cent with Pro-80 for only 1½ cents per pound of finished product.

*NEW BOOKLET TELLS MORE*
Write today. Special Commodities Division of General Mills, Minneapolis 1, Minnesota.

*Pro-80 Vital Gluten is made only by*

**SPECIAL COMMODITIES DIVISION**

General Mills

**Coca-Cola Bottling Co., Memphis, Tenn.,** plans the erection of a new production building which will house two units with a potential of about 30 cases per min.

**Beckman Instruments, Inc.,** Fullerton, Calif., announces it has acquired Watts Mfg. Co., Ronceverte, W. Va.

**Cherry-Burrell Corp.,** Chicago, announces appointment of H. Melvin Carnahan as general sales manager.

**Controls Co. of America** announces appointment of Stanley A. Johnson as director of manufacturing for its A-P Controls Div., Milwaukee.

**Continental Can Co.,** New York City, has elected George E. Dyke board vice-chairman.

**Diamond Alkali Co.,** Cleveland, has elevated Thorn F. Holder to director of research.

**Food Machinery & Chemical Corp.** reports the promotion of Robert J. DeLargey to the post of director of engineering for its chemical divisions.

**Fritzsche Bros., Inc.,** New York City, has appointed Harold L. Janovsky chief flavor chemist.

**Henry H. Ottens Mfg. Co., Inc.,** Philadelphia, has appointed Lee Hartley midwestern manager.

**Hercules Powder Co.,** Wilmington, Del., announces the completion of all details involving the acquisition of Huron Milling Co., Harbor Beach, Mich.

**Joseph T. Ryerson & Son, Inc.,** Chicago, has raised Theodore L. Kishbaugh to asst. v.-p. in procurement department.

**Kaiser Aluminum & Chemical Corp.,** Oakland, Calif., announces that its Foil Kraft Div., Wanatah, Ind., is in operation. Meanwhile, Neil R. Dewar has been named manager of its Los Angeles food container plant.

**Link-Belt Co.,** Chicago, reports the acquisition of Detroit Power Screwdriver Co., Detroit.

**Material Handling Institute, Inc.,** Pittsburgh, has elected George G. Raymond, Jr., president; R. L. Fairbank 1st v.-p., and Eugene Caldwell 2nd v.-p.

**Minnesota & Ontario Paper Co.,** Minneapolis, has elected Bruce B. Dayton to its board.

**Semet-Solvay Div.,** Allied Chemical & Dye Corp., N. Y. C., has appointed Frank M. Norton v.-p., and H. E. Imes director of operations.

**Sharples Corp.,** Philadelphia, has named Eugene C. Swift v.-p. in charge of finance.

**Wrap-King Corp.,** Holyoke, Mass., has named Edwin H. Schmitz v.-p. for sales.

**Wyandotte Chemicals Corp.,** Wyandotte, Mich., has appointed Harold R. Suter technical director of its J. B. Ford Div.

## Deaths

**Thomas S. Olsen,** 72, board member and retired executive v.-p., General Baking Co., N. Y. C.

**LeRoy Irons,** 80, asst. to the president, the Ohio Canners Assn., and the National Kraut Packers Assn.

**Joseph J. Shenson,** 72, president, Shenson's Purity Sausage Co., San Francisco.

**Leland P. Symmes,** 65, past president of Flavor Extract Manufacturers Assn.

**Stanley H. Young,** 63, board chairman, Christie, Brown Co., Ltd., Ottawa, Canada.

Quality in Plastic Containers

More than ever, it pays to specify "Premium, no matter what plastic container you need to *display and sell your product.* All sizes in stock . . . all with unbreakable Polyethylene lids.

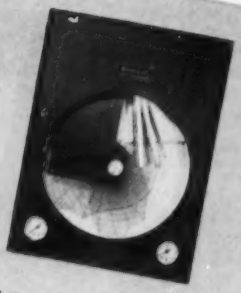
- Direct printing or labelling on lid.
- Eliminates "gumminess"—insures longer shelf-life.
- Won't drip—easier to dip from.
- Crystal-clear for maximum visibility.
- Hi-Impact for maximum strength.
- Rigid containers stack better . . . display better.
- Exclusive techniques eliminate customary strain, guarantee less breakage.
- Convenient, economical Chicago shipping point.

Write today for your FREE Experimental Kit.

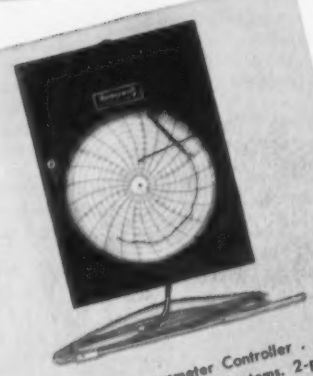
Premium PLASTICS, INC.
2440 S. Indiana Ave., Chicago 16, Ill.

Strip Chart Recorder—Single or Multiple Point . . . Records all types of variables. Choice of pen speeds and chart speeds.

Recording Wet and Dry Bulb Thermometer Controller . . . 2 ink records. Electric or pneumatic control, both pens.



Integral Cam Programmer . . . Enables complete 24- or 168-hour program to be precast. Electric or pneumatic control on one or both pens.

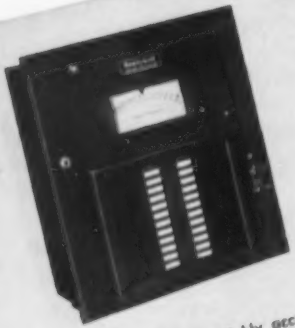


Recording Thermometer Controller . . . Wide choice of control systems. 2-pen recorders available with choice of control.

Circular Scale Controller . . . Scale is over 2½ feet long. Rotates to align indices for 12 o'clock reading. Available in all electric control forms.

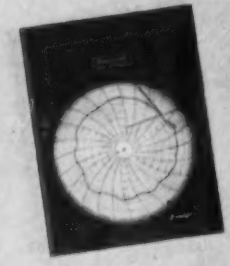
One —

Small-Case Indicating Pressure Controller . . . Requires less than 1 square foot of panel. Pneumatic control.

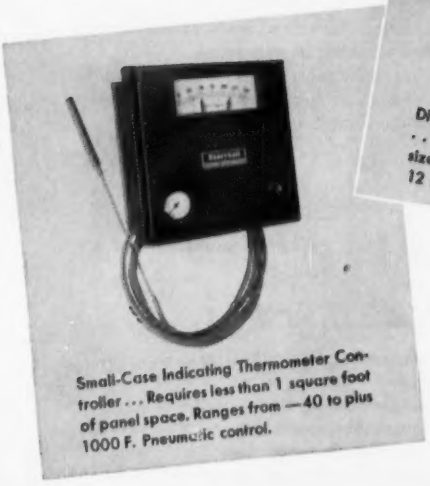


Precision Indicator . . . Highly accurate indicator for all variables, standard or special, for a variety of services.

Flow Meter—Evenly Graduated . . . Also available with electronic integrator to totalize flow as indicated on a direct-reading counter.



Recording Pressure Controller . . . Wide choice of control systems. Control on either or both pens of 2-pen model.



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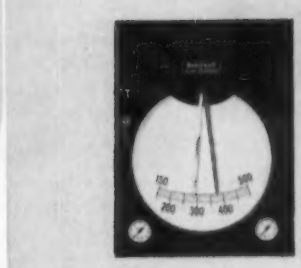

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INSIDE SCIENCE

# The Vital Story of Vitamin $B_1$

(Thiamine)

*by* Science Writer

**History.** The discovery of vitamin $B_1$ resulted from research into the cause of beriberi. Almost 50 years passed between Eijkman's discovery of the relationship of the disease to diet and the famous work of Jansen and Donath who first isolated the crystalline vitamin from rice bran.

Within ten years of that first isolation the vitamin's chemical structure was determined and it was successfully synthesized.

Eijkman's work resulted in the development of a theory that beriberi was caused by a lack of some factor in the diet and not by a toxin or infectious agent. This idea was not readily accepted until the growth of dietary knowledge proved it correct.

**Isolation and Synthesis.** In 1926 Profs. Jansen and Donath accomplished the isolation of crystalline vitamin $B_1$ from rice bran. In 1931 Windaus and co-workers successfully isolated pure vitamin $B_1$ and established its empirical formula. In 1936 R. R. Williams, and independently R. Grewe, explained the vitamin's chemical structure. That year, R. R. Williams and J. K. Cline accomplished the synthesis of thiamine which is in wide use today. Andersag and Westphal also synthesized the vitamin in 1936. Another synthesis was described by Bergel and Todd in 1937.

Photomicrograph of $B_1$ crystals

**Chemical and Physical Properties.** Thiamine hydrochloride is white, water soluble, with a nut-like, salty taste and yeast-like odor. Its empirical formula is: $C_{12}H_{17}ClN_4OS \cdot HCl$. Thiamine produced by synthesis is identical chemically and in biological activity with that obtained in pure form from nature.

**Deficiencies.** A deficiency of thiamine is characterized by these symptoms: depression, irritability, fearfulness, lack of initiative and interest, loss of appetite. Symptoms vary since in usual practice deficiencies of other water-soluble vitamins occur. Medical treatment is simple: a sufficient amount of thiamine is administered to relieve symptoms quickly and the physician provides for a continuing adequate intake.

Beriberi victim

A severe deficiency of thiamine leads to beriberi, a serious and sometimes fatal disease. While beriberi is almost a medical curiosity in the United States, it is common in countries in which polished white rice is a staple of the diet.

**Human Nutrition Requirements.** Thiamine is one of the nutritive elements the human body needs daily and does not store in quantity. The minimum daily requirements established by the U. S. Food and Drug Administration for the prevention of symptoms of thiamine deficiency disease are:

| | | | |
|---|---|---|---|
| Adults | 1.00 mg. | Children (1-5 incl.) | 0.50 mg. |
| Infants | 0.25 mg. | Children (6-11 incl.) | 0.75 mg. |

The Food and Nutrition Board of the National Research Council recommends the following dietary intake of thiamine for healthy persons in the U. S. A.

Recommended Daily Intake in Milligrams

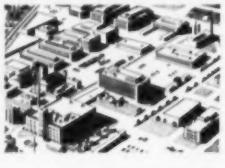
| *Age* | *Men* | *Women* |
|---|---|---|
| 25 | 1.6 | 1.2 |
| 45 | 1.5 | 1.1 |
| 65 | 1.3 | 1.0 |
| Pregnant (3rd trimester) | | 1.5 |
| Lactating | | 1.5 |

The Council recommendations for infants and children vary below and above these figures, based on age and sex. Various illnesses and stress situations can exhaust vital reserves of thiamine. So, for the physician, vitamin $B_1$ is prepared in various dosage forms and potencies for therapeutic and prophylatic use.

**How do human beings receive thiamine?** It is widely distributed in foods of animal and vegetable origin, particularly cereal grains and dry legumes. Because of public demand for refined products which millers must meet for obvious economic reasons, a loss of thiamine and other factors occurs during processing. The thiamine loss is overcome through the use of *enrichment* in cereal grain products for which Federal Standards exist, or in other foods such as breakfast cereals, by *fortification* or *restoration*. When enriching, fortifying or restoring, the food processor adds the necessary amount of pure thiamine (and other vitamins and minerals) to the food so that the finished product meets Federal, state and territorial requirements or contributes to the consumer an amount of the vitamin which dietary experts believe significantly useful.

Thiamine is extensively used for the enrichment of cereal grain foods such as white flour, white bread and rolls, macaroni products, farina, corn grits and meal, milled white rice. The story of these uses is delightfully told in a separate brochure which is available on request for reference or educational purposes.

**Production.** Huge production facilities at the Hoffmann-La Roche plant in Nutley, New Jersey, deliver highest quality thiamine *by the tons*. Roche manufactures thiamine hydrochloride and thiamine mononitrate. These fine products, which equal or exceed U.S.P. specifications, are ideal for use by pharmaceutical makers and food processors. Years of experience in research and manufacture have made Roche the leader in vitamins.



This article is published in the interests of pharmaceutical manufacturers, and of food processors who make their good foods better with essential, health-giving vitamin $B_1$. Reprints of this and others in the series are available on request. Write the Vitamin Division, Hoffmann-La Roche Inc., Nutley 10, New Jersey. In Canada: Hoffmann-La Roche Ltd., 286 St. Paul Street, West; Montreal, Quebec.

# ADVANCES IN TECHNOLOGY

### Yeasts in Yoghurt

Lactose-fermenting yeasts are undesirable in fermented dairy products because of the gases and aromas they produce.

Yeasts isolated from yoghurt seem to be close to the species *Torula cremoris* defined by Hammer and Cordes in 1920. They grow readily in milk, produce abundant gas, moderate acidity (0.26-0.29% as lactic acid) and ethanol (up to 2.25% by weight). They cause gassy-alcholic fermentations, a fruity odor, and eventual spoilage of the product.—*Applied Microbiology* 4-(5), 274-76, 1956.

### Working Under Vacuum Improves Winter Butter

Application of proper vacuum during working of butter reduces air content and gives the product a more homogeneous appearance. This is particularly noticeable in the case of winter butter.

However, different degrees of vacuum should be applied at different times of the year. Here are the methods in general use in Denmark:

In winter a vacuum of 30-35 cm. Hg is applied about 10 min. after salting and held constant until butter is dry enough to adjust water content. After water has been added, a vacuum of about 12 cm. Hg is applied and held until working is finished.

In summer a vacuum of 10-20 cm. Hg is applied during preliminary and final working. But some creameries limit vacuum to final working.

The vacuum worked product has better spreadability, denser, more uniform appearance, and scores higher than that worked in air. No significant differences in keeping quality, taste, pH, diacetyl content or peroxide value have been observed, however.—Milchwissenschaft (Nurnberg, Germany), Aug. 1956.

### Flavor of Hydrolyzates

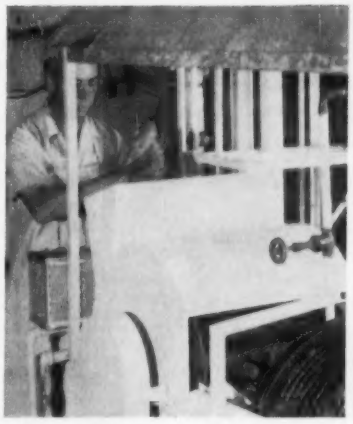
When prepared by hydrolysis of the alpha- beta- or gamma-fractions of casein with trypsin, and by the action of trypsin and crystalline chymotrypsin on commercial muriatic casein, all hydrolyzates are bitter.

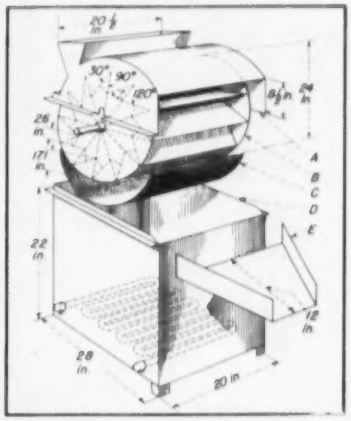
Taste of latter was materially improved by a pre-incubation with dilute NaOH or by use of the enzyme 'Protease' (Takamine). These treatments split off orthophosphate from phosphoproteins. Removal of orthophosphate with intestinal phosphatases, however, did not improve the taste.

Tryptic casein hydrolyzates, on fractionation by paper chromatography, yielded an extremely bitter-tasting fraction E which appears to be a single polypeptide. Carbon treatment improves taste of the hydrolyzates, but it also removes a large part of the tryptophan.—*J. of Science of Food & Agr.* 7 (10), 629-37, 1956.

### Dehydrofrozen Apricots

As a method of food preservation, dehydrofreezing offers numerous advantages over conventional freezing. Among these are the substantial re-






**ROTARY LYE PEELER** used in sweet potato studies. Left: Tubers are fed into top of unit and conveyed through lye solution. They then drop into rotary washer where loosened peels are removed. Right: Schematic of peeler. Cover (A) and chute (E) are made of 10-gage sheet metal. Rotary drum (B) comprises 12 pockets of 16-gage perforated steel spot-welded to 10 gage circular sheets with ¾-in. metal shafts welded to each end. Shafts are fitted into pillar blocks resting on angle rims of caustic tank (D). This 10-gage sheet steel tank has a 1-in. dia. steam coil in bottom. Curve baffle (C) of 16-gage perforated steel was welded in tank (D) about ½ in. below drum (B). *Official USDA photographs by Southern Utilization Research Branch.*

## Factors Influencing Losses During Lye Peeling of Sweet Potatoes

Studies on preparation of sweet potatoes for processing, in which the pilot scale rotary peeler shown above was used, disclosed that—

1. Peeling losses are higher for potatoes stored at 50F. and lowest for those stored at 50F.

2. Losses are slightly higher when tubers are preheated for 30 min. in 130F. water than when they are preheated 10 min. in 165F. water or not at all.

3. Variations in lye concentrations from 10 to 20% for peeling time of 6 min. at 210-220F. did not significantly affect losses.

4. Larger potatoes have less peeling and trimming losses than smaller ones.

5. Goldrush variety had lower trimming losses than the other varieties tested (Unit I Porto Rico and Earlyport).—*Food Technology*, 541-43, Nov. 1956.

ductions in container, shipping, and storage costs, with no apparent loss of quality.

These results have been substantiated by both laboratory and commercial trials. The former involved selection of fruit, inactivation of enzymes, procedures for dehydration, and methods of using the product in preserves and pies. Fruit known in the trade as "freezing ripe" proved most desirable.

Prevention of browning was best accomplished by treatment with $SO_2$ solutions in a 2-step process. Whole apricots were dipped for 2 min. in a 1.5% solution at room temperature. The fruit was then cut, pitted, and given a second dip of 15 sec. in a 0.4% solution. Stainless steel baskets were used in the dipping process, and the fruit was allowed to drain after the second dip.

Dehydration was carried out in a forced-draft cabinet dryer, with an air velocity of 900 fpm. Good products were obtained at 50% weight reduction in about ½ hr. at dry-bulb temperatures not over 200 F. and wet-bulb temperatures of 85-105 F.

Stability of packaged and frozen product was very good. Samples held at 0 F. for 2 yr. showed no noticeable loss in quality. Organoleptic tests showed that pies made from the product were as good as those made from conventionally frozen apricots.

In commercial trials, laboratory procedures were modified somewhat. A stronger solution (2.5% $SO_2$) and longer time (2.5 min.) were used in the first dip, and a spray of 2.5% solution replaced the second dip. Rate of spray was 0.2 gpm./ft. of tray width. Speed of belt carrying the trays under nozzles was 10 fpm.

The treated fruit was dried for 2.5 hr. on wooden trays in a commercial prune-drying tunnel at not over 200 F. dry-bulb temperature. Product was packed and frozen in 30-lb. cans. Trial packs of preserves by two commercial packers showed that color, flavor, and texture were all good.—*Food Technology*. 489-492, Oct. 1956.

## Fungicidal Wax Coatings Up Fruit Storage Life

Storage life of fruits and vegetables, may be increased by coating with fungicidal wax, though its use is contrary to pure food regulations of many countries.

Mangoes of the Badami (Alphonso) variety, were treated by dipping in an emulsion of 1.7-2.7% fungicidal wax (micro-crystalline paraffin 40 parts, low-melting point, thermoplastic terpene resin 31 parts, oleic acid 7 parts, triethanolamine 17 parts, o-phenylphenol 5 parts) for 1 min., followed by draining and drying in a current of air at 100-125 F. for 3-4 min.

The treatment lessened physiological losses in weight, increased retention of vitamin C and moisture, delayed ripening, decreased waste and increased storage life of the fruit.

Losses from disease were decreased from 36% in untreated controls, to 29% in mangoes treated with the 1.7% emulsion, and to 11% in fruits treated with the 2.7% emulsion.—*J. of Science of Food & Agr.* 7(10), 673-76, 1956.

## Firm Summer Butter

Spreadability of butter can be greatly influenced by proper treatment of cream prior to churning, and careful control of the churning and working procedures.

One result of this research has been production of summer butter (from fat of high iodine value and low solidification point) that is firm at temperatures as high as 70F.

To accomplish this, the cream should be ripened at 40F. or below, churned between 50 and 54F., washed and worked at this temperature. Great care should be exercised to prevent a temperature rise during churning as the result of warm air in the churn.

In addition to increased firmness, a finer distribution of water is attainable by the cold process.—Milchwissenschaft (Nurnberg, Germany), 11, 267-72, Aug. 1956 (in German).

## Kaffir Beer Studies

Traditional drink of the Bantu people of Africa, kaffir beer, is a beverage with a pleasantly sour taste and the consistency of thin gruel.

Freshly prepared, it rarely contains more than 4% alcohol, but since it is consumed while actively fermenting, it may contain 1-8%. It also contains 0.3-0.6% lactic acid and 4-10% solids.

The beer is brewed by employers and supplied to workers as part of their rations. It is also brewed by several municipalities in the provinces of Natal and Transvaal. Production in municipal breweries amounts to about 785,000 U. S. bbl. almost the same as the production of conventional types of ale, beer, and stout.

Kaffir beer is produced from a mash of malted kaffir corn (similar to milo or sorghum), and unmalted kaffir or maize. Mash is first allowed to sour naturally, the temperature of souring favoring growth of thermophilic lactic acid bacteria such as *L. delbrueckii*, which predominates. When sufficiently acid the mash is boiled, partly cooled, and more malt is added.

Formerly fermentation of the mash was spontaneous, and several species of yeast participated with *S. cerevisiae* predominating. In the modern breweries, culture yeasts may be added to the cooled mash.

Fermentation lasts 4-8 hr., after which the beer is ready for consumption. Straining of husks is the only clarification treatment. As it is drunk while in active fermentation, and because natives do not like their beer cold, product has a very limited storage life, though keeping it under $CO_2$ pressure extends this considerably.—*J. of Science of Food & Agr.* 101-13, Feb. 1956.

## Breadmaking Properties Of Irradiated Wheat

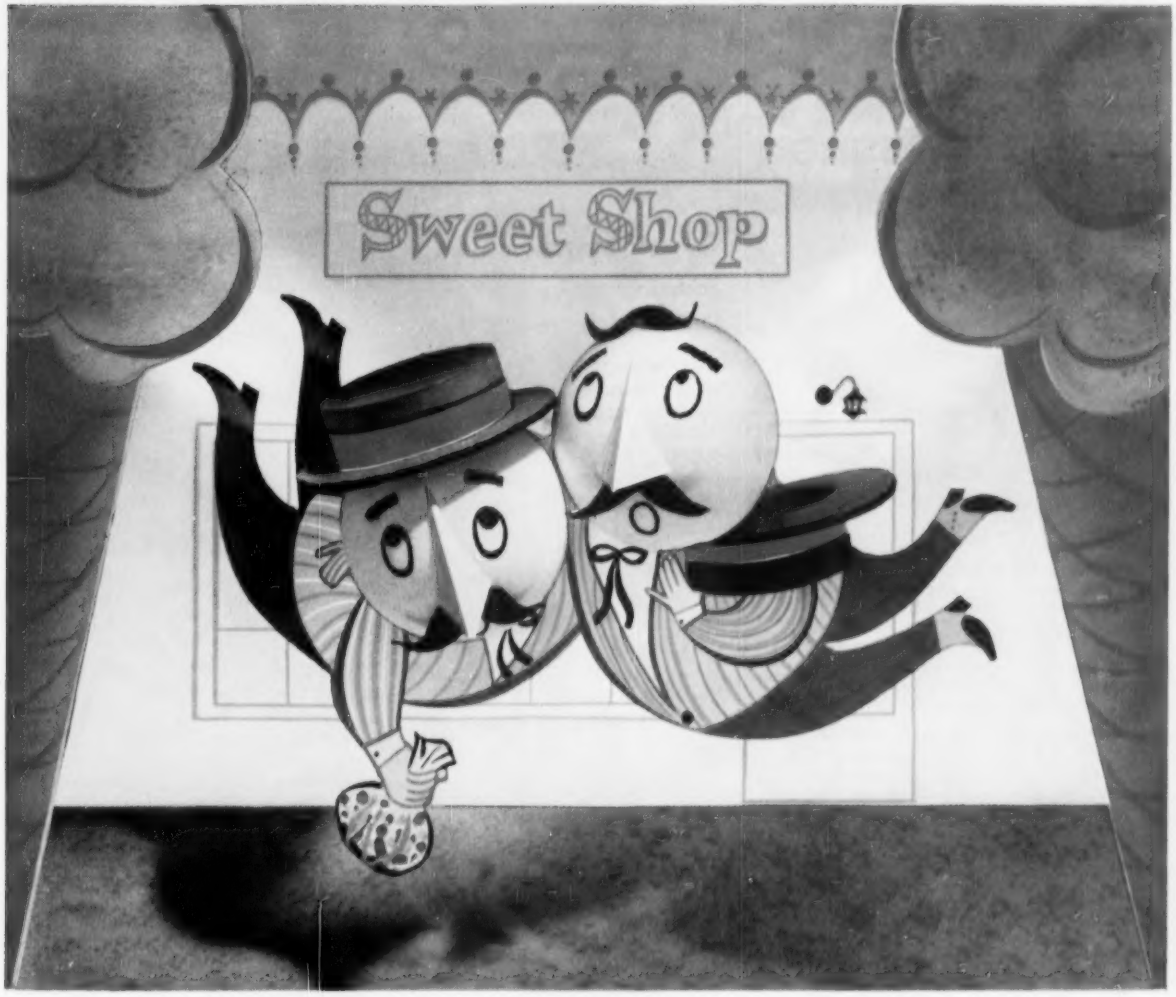
Loaf properties of bread made from wheat irradiated at a level of 125,000 rep showed improvement over those of the control, but inferior results were produced at higher dosages. This and other conclusions were reached in a series of tests designed to evaluate properties of flour milled from wheat irradiated at levels up to 1,000,000 rep.

Samples of hard red winter wheat were given dosages of 125,000, 250,000, 500,000 and 1,000,000 rep, respectively, and milled to an average flour extraction of 60%. A control sample was similarly prepared.

Biological tests showed that germination, (originally 95%) was reduced by nearly ¾ with a dosage of 125,000 rep and practically to zero by the 1,000,000-rep treatment. There was no immediate change in fat acidity, protein solubility, or fluorescence of acid extracts of the grain.

Biochemical analyses showed a regular decrease in sedimentation value with increased irradiation, marked and regular increase in maltose value, and a corresponding but drastic increase in maximum amylograph viscosity.

DOW

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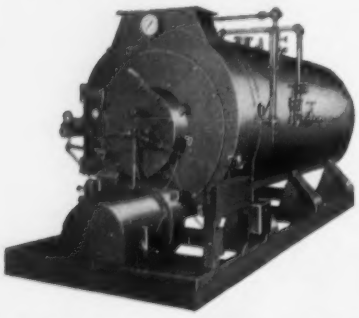

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Dough properties showed a tendency toward shorter development time and accelerated breakdown with overmixing. Radiation also caused doughs to become stiffer and less extensible. Bread quality from all treatment levels was surprisingly good, although there was a decrease in crumb and loaf-volume characteristics at dosages beyond 250,000 rep. —*Food Technology*, 528-31, Nov. 1956.

## Foaming of Egg Whites Improved by Additive

By subjecting egg-white to a mild alkali treatment, a composition is formed which, when added to other untreated egg-white, will improve foaming properties of the latter.

The patented procedure is carried out as follows: Alkaline agents in aqueous solution, for example NaOH, are introduced into egg whites in sufficient quantity to cause gelation at room temperature. Concentrations of 1-3% by weight are desirable.

Gel begins to form immediately upon addition of the alkali, and in a few minutes the mass sets in a solid rubbery condition. The final step is restoration of normal pH by the addition of an edible acid. Product can then be used as an additive to improve whipping properties of untreated egg-white.

Other desirable steps in preparation of the additive are addition of $H_2O_2$ to the whites to free them of $H_2S$, and homogenization of final product to break up insoluble protein precipitate.

Depending on the result to be achieved, the additive will be combined with untreated whites in quantities varying from 1-10% by weight. —U.S. Patent 2,752,248, June 26, 1956.

## Irradiation Stops Sprouting, Ups Sugars in Potatoes

Experiments on effect of irradiation on sprout prevention and chemical composition of potatoes may be summarized as follows: Gamma dosages between $7.0 \times 10^3$ and $2.1 \times 10^4$ rep definitely inhibit sprouting during storage, and a dosage of $1.0 \times 10^4$ rep increases the reducing sugar concentration.

In the sprouting tests, potatoes were exposed to rep dosages of different intensities—zero, $7.0 \times 10^3$, $2.1 \times 10^4$, and $2.8 \times 10^4$—and stored in unsealed, perforated polyethylene bags at 50 F. and 50% relative humidity.

Intensive sprouting occurred in non-irradiated controls after 3 weeks storage and increased up to 5½ months when tests were discontinued on account of spoilage. Panel taste tests indicated no preferences for controls over irradiated potatoes, although it was observed that potatoes exposed to the two higher reps had a sweeter taste.

Reducing sugars were determined in slurries of irradiated and control potatoes before and after incubation with invertase. In a second set of experiments non-irradiated potatoes were removed from storage at appropriate times and irradiated. Reducing sugars were determined as before after incubation with invertase. Both tests showed an increase in reducing sugars after irradiation.—*Food Technology*, 532-36, Nov. 1956.

## Preservation of Shrimp

Deterioration and discoloration of freshly-netted shrimp can be inhibited by storing them in an aqueous dispersion of a water-soluble dextran.

According to the patented process, the dextran forms a film over the surface of the shrimp that prevents oxidative changes and retards bacterial growth and multiplication. Shrimp thus treated reach their destination free from brown spots or blemishes.

The dextrans, which are high molecular weight polysaccharides, may be produced bacterially. According to one method a sterile aqueous nutrient medium is inoculated with *Leuconostoc mesenteroides* and incubated at 80 F. for 12-48 hr. When fermentation is complete dextran is precipitated, purified, and dried. Dextrans of various molecular weight can be produced.

Concentration of dextran in aqueous storing medium may vary between 1 and 10% by weight. Preferred dextran has a molecular weight between 20,000 and that of the native, unhydrolized dextran.—U.S. Patent 2,758,929, Aug. 14, 1956.

## Bactericidal Ice

Addition of an amphoteric surface-active agent to water about to be frozen is the patented feature of a process for making bactericidal clear ice suitable for preservation of fish and other foods. The agents possess sufficient bactericidal activity to completely inhibit growth of undesirable bacteria while being unobjectionable from the standpoint of public health.

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Satisfactory surface-active agents are those having at least one basic nitrogen atom with at least one aliphatic chain of at least 6 carbon atoms attached thereto, and at least one free carboxyl group attached to one of the basic nitrogen atoms by means of a bi-valent low-molecular bridging group.

Typical agents are octly di-aminoethyl glycine and di-octylamino ethyl glycine. These are added to water at the rate of 0.08g./l. and 0.02g./l., respectively, and air is blown through the water while it is being frozen.

Another suitable combination is 0.05g./l. of dococyl di-aminoethyl aminomethyl-salicylic acid and 0.05g/1. of di-decylhydroxeythylaminoethyl glycine. Other pairs of agents are available having the general formulas of the pairs indicated above.—U. S. Patent 2,755,191, July 17, 1956.

## Alkaline Treatment of Hops Increases Their Bitterness

Beer bitterness is now known to be due in a large measure to conversion products of the humulone of the hops during boiling.

Since it is known that this conversion is hastened by alkaline heating, pretreatment of hops by this method has been suggested by Kolbach, Govaert and others. To get a more precise measure of the effect, an alcoholic solution of humulone was boiled with 0.1 N NaOH for periods up to 32 min. before neutralizing and adding to boiling malt wort.

Bitter substance content of beer produced by these additions increased about 2½ times over that made with no alkaline treatment, and about 50% over beer hopped in the normal way.

Maximum bitterness occurred after boiling the humulone in alkali for 16 min. Similar but less pronounced results were obtained when lupulin, which contains resins as well as humulone and lupulone, was treated. Indicated saving in hop usage was 20-30%.

The alkaline treatment is of interest to German breweries since there is a possibility of using it without violating the "Reinheitsgebot" or "purity law" that applies to Bavarian beers. The process needs more study, however, since the pretreated hops are boiled only a short time in wort.—*Wissenschaftliche Beilage, Monatsschrift für Brauerei*, 9(7), 75-77, 1956.

IT TOOK MORE THAN AN EGGSHELL . . .

to settle this coffee-making problem

Time was when smart housewives dropped an eggshell in the pot to keep coffee grounds collected at the bottom. But the advent of modern spray drying methods has produced the "instant" beverage and made the old coffee pot just a memory.

*Ducon Cyclone TYPE SD*

Today, efficiency engineered Ducon Cyclone Collectors help to assure success for the coffee processor's secret of solubility. This maintenance-free equipment is providing uninterrupted service with a high degree of recovery, plus quality control for all types of spray drying applications. Minimizing particle breakage, the unit not only collects valuable fines but returns them as part of the marketable product. Like all Ducon Collectors, it is a result of the kind of engineering which has made Ducon "the name" in dust control.

There is a Ducon unit for every dust collecting problem. Send today for descriptive literature.

the name in dust control

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*Designers and Manufacturers of Dust Control Equipment Exclusively*

CYCLONES • CENTRIFUGAL WASH COLLECTORS • TUBULAR CLOTH FILTERS • DUST VALVES

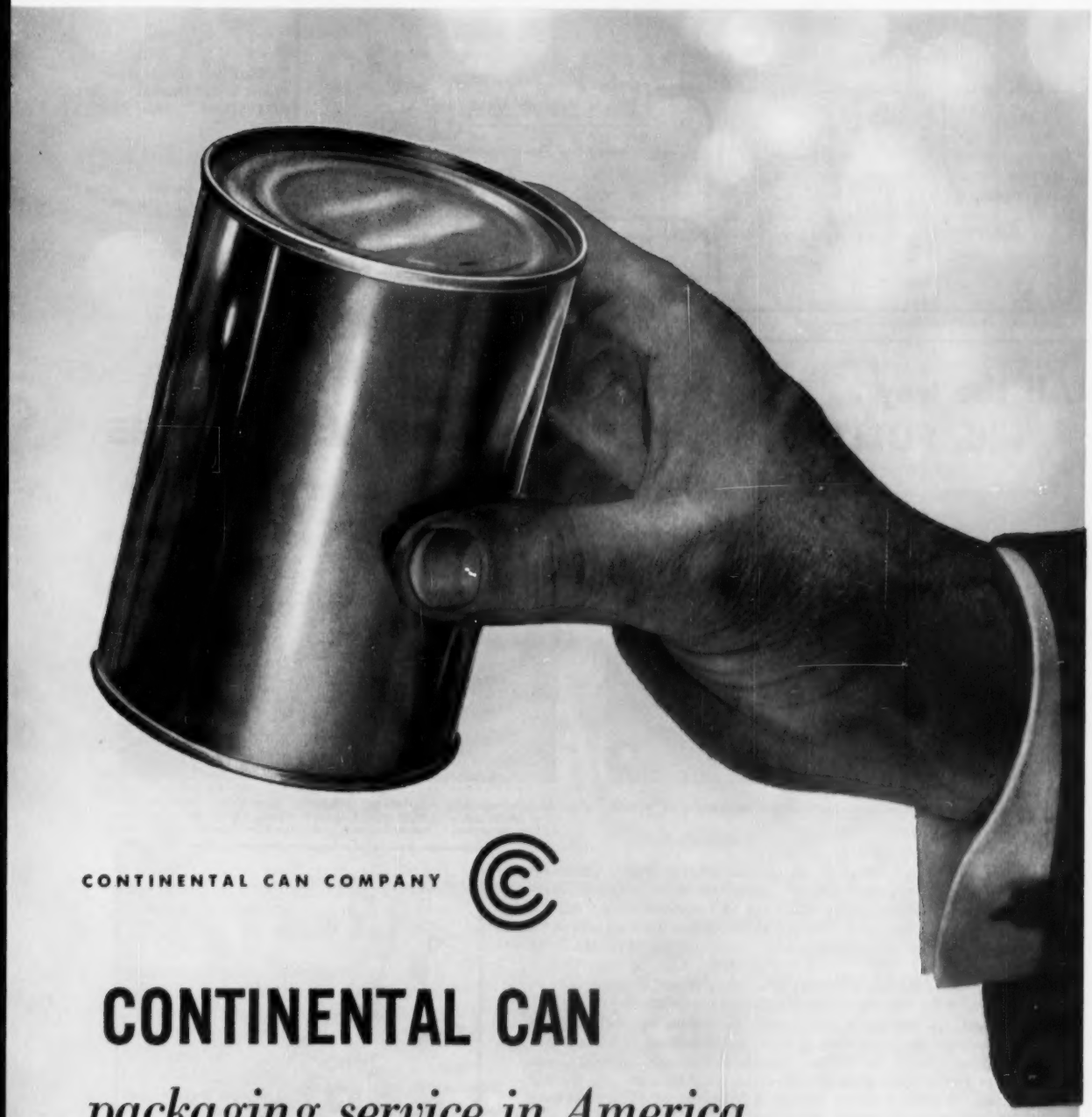
HAZEL-ATLAS GLASS COMPANY

# HAZEL-ATLAS GLASS *joins*

## *...to bring you the most complete*

To the customers of Hazel-Atlas — indeed, to any manufacturer or processor who needs glass packaging—Continental Can extends a warm welcome. For the same skilled designers and craftsmen who have made Hazel-Atlas one of the nation's leading makers of glass containers, are now at your service when you call Continental.

Beyond this, you now have at your disposal the facilities of one of the world's leading makers of containers of all kinds. The Continental Can Company, through its various divisions, provides a wide range of technical services and merchandising assistance. Its research laboratories are nationwide in scope, up-to-the-minute in equip-



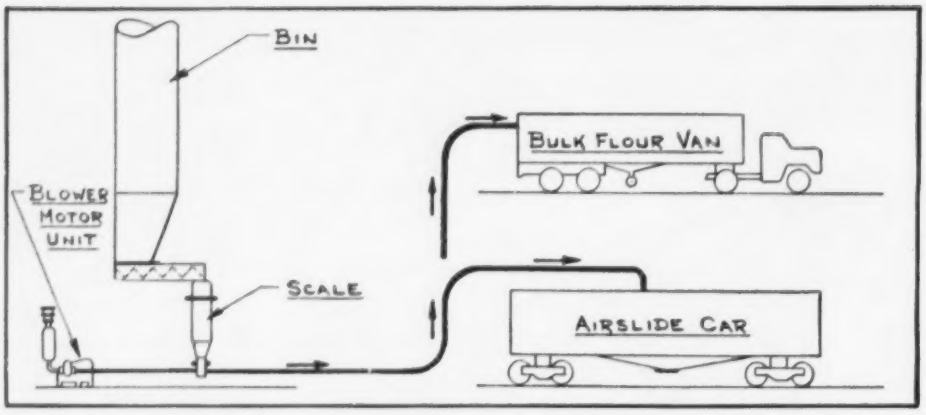
CONTINENTAL CAN COMPANY

# CONTINENTAL CAN

## *packaging service in America*

ment, and staffed by the foremost experts in successful packaging.

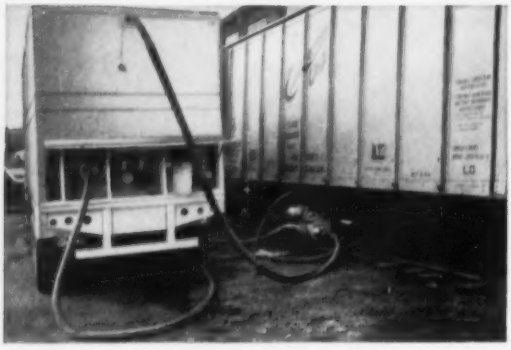
Continental's ever-growing facilities can best be summed up in terms of benefits to you—complete packaging service to meet every packaging need, backed up by assured fast delivery, wherever your plant may be located.




*VISIT OUR BOOTH 1664*
*PLANT MAINTENANCE SHOW*
*CLEVELAND JAN. 28-31*

Loading flour at mill to either Airslide van or Airslide car.

# All the way . . . from mill to bakery . . . with FULLER PNEUMATIC CONVEYING SYSTEMS



Unloading flour with Airslide transfer unit from Airslide car to Airslide bulk-flour van.

Airslide bulk flour van delivery to bakery. Note Fuller blow-through type feeder charging flour from Airslide fluidizing conveyors in bottom of van connected to conveying line to storage bins in bakery.

Now, for the first time, because of the joint facilities of Fuller Company and General American Transportation Corporation, a complete bulk-handling system is made available under one unit responsibility. All the way, from the minute flour leaves the bin in the mill, until it arrives at its destination, it is handled in a completely sanitary manner, free from comtamination.

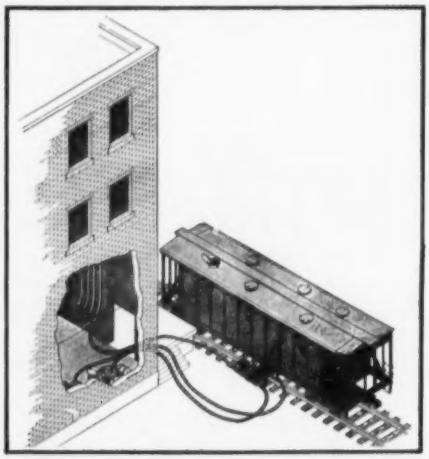
No matter if the bakery is located on a siding or not, Fuller is able to furnish equipment for unloading and delivering to your plant.

In addition to complete Airveyor® car-unloading and in-plant systems of the vacuum or pressure type, or combinations of both, Fuller has designed and built the Fuller Airslide® Portable-Transfer Unit, extending the field of application of both the Airslide bulk car and Airslide bulk flour van. Smaller bakeries, as well as large, can now realize savings possible by handling bulk flour.

For bakeries remote from a railroad siding, Airslide bulk cars can be unloaded with the Airslide Transfer Unit to Airslide bulk flour vans, the van discharging the flour direct to storage bins in the bakery. For the bakery having a siding, the unit can be used to transfer flour directly from Airslide cars to storage in the plant.

The Airslide transfer unit is a unique combination of the F-H Airslide air-activated gravity conveyor and Airveyor pressure type conveying system, wherein the flour is ideally fluidized by the Airslide for charging into the conveying system by the blow-through type of feeder.

Fuller is also in a position to furnish, for appropriate applications, principal system-proved components for in-plant conveying, such as blow-through feeders, rotary air locks, diverting valves, switches, and Airslide conveyors.



Unloading bulk flour with Airslide transfer unit direct from Airslide car to storage bin in bakery. Note blowers installed in bakery furnishing air for conveying and for actuating the Airslide Fluidizing Conveyors.

**FULLER COMPANY, 114 Bridge St., Catasauqua, Pa.**

SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION

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**Fuller**
. . . . pioneers in harnessing AIR

# QUESTIONS & ANSWERS

## THIS MONTH'S PROBLEM

*Question—We are faced with the problem of sterilizing chopped vegetables, which are saturated with pickling brine. Furthermore, the chopped vegetables should be cooled again after heat treatment. We have experimented with a jacketed kettle and find the process very slow, and the continued agitation very laborious. Can you suggest a better way?*

## NOVEMBER PROBLEM

### Making Pizzas

*The Question Was—Our bakery is planning to make pizza pies. But we need better formulas than those now being used for preparing the dough and various fillings. Can you come to our aid?*

Answer—Not having your formulas, of course, puts us in a position of not knowing if ours are as good as yours. Too, you don't mention specific fillings you'd like to use. But the following are worth trying:

**Pizza Dough Formula**

| | |
|---|---|
| Flour | 15 lb. |
| Water | 15 lb. |
| Yeast | 5 oz. |
| Salt | 5 oz. |
| Shortening | 20 tablespoons |
| Olive oil | Sufficient for kneading |

*Processing Directions*—Fill mixing bowl with flour, make a well, add water along with dissolved yeast and salt, and then mix thoroughly. Now add melted shortening, and knead until elastic and pliable. Pour a little olive oil over dough, knead a few minutes, and flatten to thin sheets the size of bake pans.

Now try any of these four fillings.

**1. Cheese Filling**

| | |
|---|---|
| Mozzarella cheese (sliced) | 10 lb. |
| Olive oil | 2½ lb. |
| Tomatoes (fresh and cut up) | 20 lb. |
| Onions (chopped) | 1¼ lb. |
| Oregano | 1¼ oz. |
| Salt and pepper | to suit. |

*Directions*—Level tomatoes and onions over dough sheet brushed with olive oil. Now put on sliced cheese, brush again with olive oil, sprinkle with salt and pepper, and bake about 30 min. at 425F.

**2. Sausage Filling**

| | |
|---|---|
| Chopped garlic sausage | 10 lb. |
| Cut and peeled tomatoes | 10 lb. |
| Olive oil | 1¼ lb. |

*Directions*—Cook sausage about 5-7 min. in olive oil. (Half of the sausage could be replaced with sliced, fresh mushrooms.) Pour oil-cooked sausage (or half-and-half sausage and mushrooms) over dough, add tomatoes, and press them into dough. Bake ¾ hr. at 350F.

**3. Anchovy Filling**

*Directions*—Press anchovy fillets (cut up, if necessary) into dough brushed with olive oil. Scatter chopped onions, salt, pepper, and (if you want) sliced olives over dough. Bake ¾ hr. at 350F.

**Ham and Cheese Filling**

| | |
|---|---|
| Ham (1-in. pieces) | 7½ lb. |
| Parmesan cheese (grated) | 2½ lb. |
| Tomatoes (peeled and cut up) | 12-15 lb. |
| Olive oil | Sufficient |
| Basil | To sprinkle |
| Salt and pepper | To taste |

*Directions*—Sprinkle ham and tomatoes over olive oil-brushed dough. Season, and sprinkle well with cheese and olive oil. Bake ¾ hr. at 350F.

Perhaps some FE readers might submit good pizza-filling formulas.

### Rayed Packaging Materials

*Question—Your Special Report, "Progress in Flexibles Offers New Package Opportunities," (FE Nov. '56 p. 69) contained some interesting highlights on treating packaging materials with radiation.*

*This leads me to inquire if you have any further information on this subject. I'm particularly interested in knowing if we, in the food industry, can expect new and better packaging materials through application of atom chemistry?*

Answer—As you perhaps know, extensive experimental programs are now underway in the field of bombarding plastic-type food packaging materials with radiation—and without the use of heat and pressure.

In general, such new "radiation polymerized" plastics are purer and more resistant to heat and corrosion. Some synthetic polymer films even come up with harder finishes.

Extensive investigations are under way on a "graft" copolymerization technique employing ionizing radiation from nuclear sources or particle accelerators. Technique involves depositing a chemically bound phase of a secondary polymer—vinyl, styrene, etc.—in the starting film, the process being initiated by beta or gamma radiation.

Such modified plastic films have, in some instances, exhibited sought-for properties different from the starting film.

Possibility of trying out this technique on cellulose and its derivatives is under consideration.

Researchers also look to the possibility of using atom chemistry in:

1. Producing new plastics and adhesives.
2. Preparing special coatings or films.
3. Resin-impregnating and curing papers.
4. Building colors, tailor-made, into films, papers and foil.
5. Bonding resins directly to fibers and films.

### Improving Noodle Quality

*Question—For some time we've been manufacturing a rolled egg noodle, for which we had a fairly good demand. Lately, we've noted that many of the competitive products on the store shelves have a much deeper and more attractive yellow color than our product.*

*Furthermore, surfaces of these competitive products seem smoother*

### HOW TO DO IT?

**Readers are invited to submit to FOOD ENGINEERING answers to question, "This Month's Problem." Selected answers will be published with credit (unless you specify otherwise). We pay space rates.**

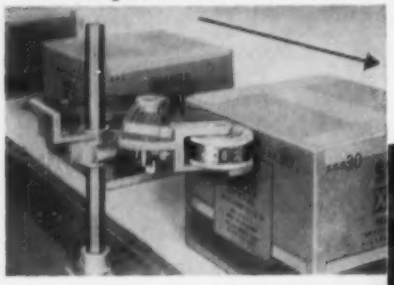
### JUST ASK US

**Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.**

**Write to Questions & Answers Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.**

# Low-cost marking attachment pays for itself in weeks... saves thousands of $ every year

***Imprints 1, 2 or 4 sides of cases in single pass***



◀ **ROLACODER twin-action markers ... for imprinting codes and lot numbers on 2 or 4 sides of cases simultaneously ... without requiring cases to be turned.**

Friction-driven ROLACODER markers do your marking automatically... save cost of manual stencilling or stamping. Designed for easy do-it-yourself installation on existing conveyor lines, case-sealers, etc. They use quick-change rubber type or dies, hold 8-hour ink supply. *Write for descriptive literature*

▲ **ROLACODER single-side marker for accurate spot imprinting of brand names, varieties, code-dates, lot numbers on cases, cartons, fibre drums, bags, etc.**

Gottscho

**ADOLPH GOTTSCHO, INC.**

**Dept. G, Hillside 5, N. J.**

*In Canada:* **RICHARDSON AGENCIES, LTD., Toronto & Montreal**

*Automatic Production-Line*
**CODING, MARKING IMPRINTING MACHINES**

ASHWORTH
NEW
OMNI-FLEX®
BELT
ECONOMICAL • FLEXIBLE
Let your production ride around corners on the new low cost OMNIFLEX belt. Short turning radius, light weight, easily installed and maintained.

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Sales Engineers: Atlanta • Buffalo • Charlotte, N. C. • Chicago • Cleveland • Dallas • Detroit Greenville, S. C. • Los Angeles • Louisville • New York • Philadelphia • Rochester Seattle • St. Louis • St. Paul • Canadian Rep., PECKOVER'S LTD., Toronto • Montreal

*WRITE FOR ILLUSTRATED CATALOG OMC-56*

*than ours with the result that their appearance is enhanced. We expect such competition will cut into our sales, and would like to know, if possible, how we can duplicate this appearance.*

Answer—We assume that you are using a good grade of egg yolk and have satisfied yourself by chemical analysis that your competition is using approximately the same percentage of egg yolks as you are. If so, the difference in color and surface appearance which you have noted is very likely the result of your competitors' use of a different process and equipment.

Today, many noodle manufacturers are producing an extruded noodle, using a continuous-type, mixer-kneader-press and a suitable die. The press is very similar to equipment used for manufacture of macaroni and spaghetti items, and it usually is rated at about 1,000 lb. per hr.

With flour and egg solution feeding in at a constant rate, the product is of uniform composition. Thus variations, such as can occur from batch to batch on the older type of equipment, are practically eliminated. A further important advantage of such a press is that the mixing chamber or the extrusion pressure screw can be held under vacuum by addition of proper accessories and suitable vacuum pump.

Such a vacuum system is beneficial from a quality standpoint, as it helps to preserve the desirable yellow color. Although vacuums of 24-25 in. can be obtained with the usual equipment, there does not seem to be much benefit in going beyond about 19 in.

The extrusion screw delivers properly mixed dough, under high pressure, to a die containing a narrow slot. From here, it emerges as a sheet, ready for calibration rolls and cutter. Because of frictional resistance in the die, there is a considerable heating effect at this point.

---

**Q.—Have you any information on glazing boiled hams and carmelizing the glazing material?**

**A—First prepare the glaze by heating to about 125F. in jacketed kettle, three 5-lb. cans of Karo corn syrup (dark), 6 lb. of gelatin, 18 oz. of paprika, 12 oz. of cloves, and 3 gal. of water. To this add 6 lb. of burnt sugar for its carmelizing effect. Amount of burnt sugar can be increased or decreased, according to color desired. Either dip hams into glaze or brush on the glaze, which sets immediately.**

---

*SIXTH ADVERTISEMENT OF A SERIES* *"THE HISTORY OF GLASS CONTAINERS"*

# 1918

Although many other industries were affected by the interruption of vital imports during World War I, American glass container manufacturers fortunately had access to fully-developed domestic sources of raw materials. Thus it was possible to step up production of glass jars and bottles, in order to meet a new and rising demand for glass-packaged foods, drugs, cosmetics, and beverages of all types.

Consumer preference for glass-packaged products has continued to grow through the years, with production methods keeping pace. Metro has helped the industry maintain that pace through research and development . . . a part of METROmatic service . . . . assurance of a quality product, delivered on an unfailing schedule, geared to specific production requirements.

## METRO GLASS COMPANY, INC.

MANUFACTURERS OF QUALITY GLASS CONTAINERS

JERSEY CITY, NEW JERSEY

WASHINGTON, PA. CHICAGO, ILL.

# 18 CALORIES

*Surprise you that there are only 18 calories in a level teaspoonful of sugar? (Some people we asked guessed as high as 600.) You'll normally use up as many calories as you get in a teaspoonful of sugar every 7½ minutes!*

# PAY-OFF THOUGHT

The short, sweet message in the "box" above appears in all the big full-page newspaper and magazine ads published by Sugar Information, Inc.

It makes mighty reassuring reading to just about everybody who likes good foods and beverages. This thought pays off to everybody who makes, distributes, or sells these sugar-containing products.

It shows people that sugar contains a lot fewer calories than they may have believed. The fad for artificial, coal-tar sweeteners exists because of misinformation about sugar.

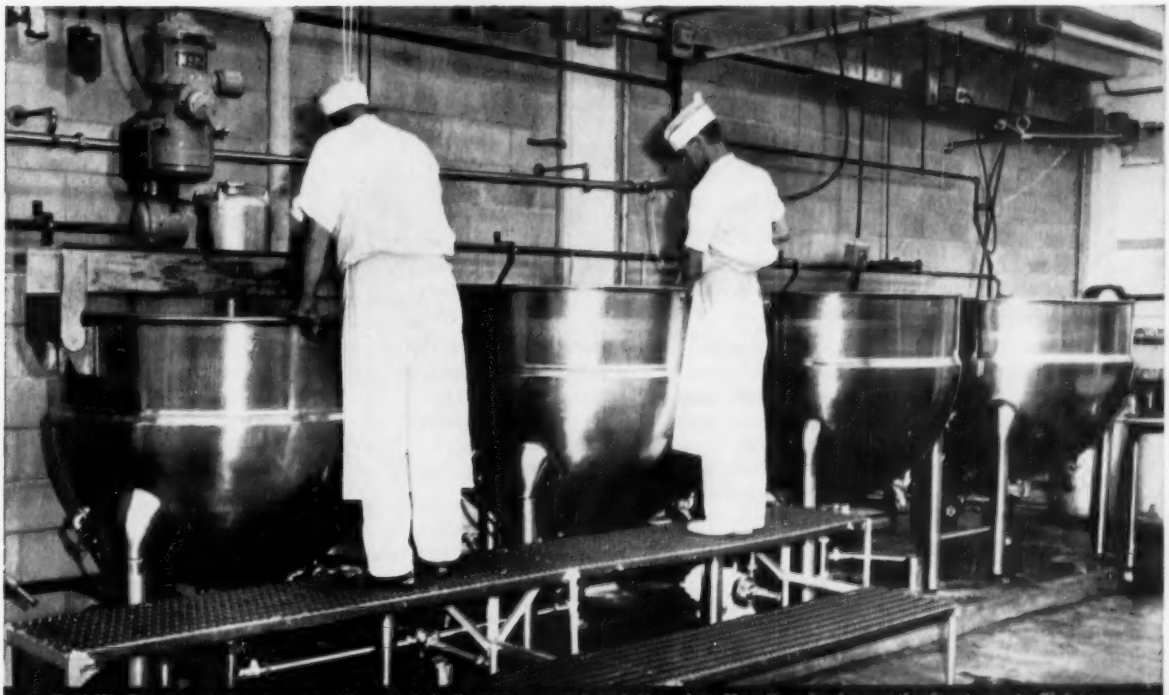
Every ad that carries the 18-calorie message runs to more than 100 million impressions. They're *good* impressions—*lasting* impressions.

Surveys show that virtually every reader remembers that a spoonful of sugar contains only 18 calories.

**SUGAR INFORMATION, INC., NEW YORK 5, NEW YORK**

*When You Need a Kettle Quick!*

# Hamilton Kettles Choice for New Howard Johnson Commissary . . .



*Fred W. Scott, manager, reports, "We've tried all types . . . and we believe that Hamilton kettles are the finest, most efficient on the market." Recently installed kettles: one 200 gallon style CG Mix Cooker, three 300 gallon style SA kettles.*

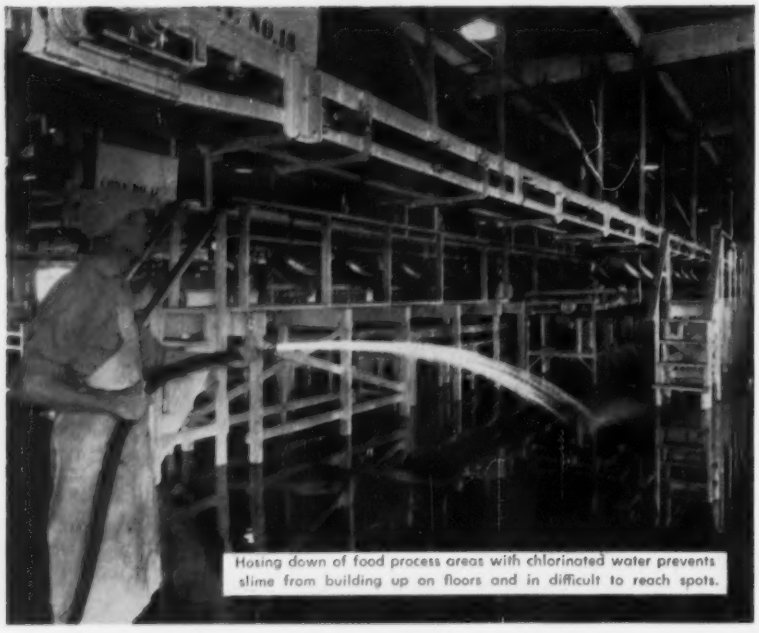
The new Howard Johnson Food Commissary, Miami, Florida, selected Hamilton Kettles for fast cooking, sanitary design and stainless steel construction.

Chef O. E. Rathfeldt likes the way Hamilton's extra large kettle diameter gives fast cooking, increases production. He also says streamlined, sanitary design makes equipment easy to clean, saves valuable down time, and the stainless steel construction protects against corrosion, guarantees unusually long kettle life.

More and more food commissaries, meat packers, canners and other members of the food processing industry are turning to Hamilton for fine kettles and prompt service. For information on the complete line of Hamilton Kettles, call Paul Hock, GRandview 1-4110 or write.

## HAMILTON COPPER & BRASS WORKS

**Division of the Brighton Corporation** **824 State Avenue** **Cincinnati 4, Ohio**


Hosing down of food process areas with chlorinated water prevents slime from building up on floors and in difficult to reach spots.

**HOW W&T IN-PLANT CHLORINATION**

*cuts clean-up time and keeps plant cleaner*

At a large eastern quick-freezing plant, slime accumulation on processing floors was a problem. It was necessary to halt production runs frequently for clean-ups.

Wallace and Tiernan Chlorinators were installed on the plant water system and all water in the plant is now chlorinated. Besides eliminating slime on processing floors and equipment, In-Plant Chlorination helps to maintain a higher level of plant sanitation with greater ease. Clean-up times have been reduced as much as 50%. Floors are no longer slippery from slime and accidents from this source have been virtually eliminated.

For information about W&T In-Plant Chlorination send for Bulletin #I-58.

**WALLACE & TIERNAN INCORPORATED**

25 MAIN STREET, BELLEVILLE 9, NEW JERSEY

**MERCHEN GRAVIMETRIC FEEDERS & METERS**

*for dry free-flowing materials*

- automatic batch control
- continuous blending
- materials accounting

**Accuracy 1%**
**Rates 3 to 3000 lbs. per min.**

***Write for Bulletin No. M-32***

**WALLACE & TIERNAN**
INCORPORATED
25 MAIN ST., BELLEVILLE 9, N. J.

M-32

As a result, some manufacturers find it advisable to provide cooling, such as by a fan blowing on the extruded sheet.

A comparatively recent development involves equipping the metal die block with actual extrusion surfaces of the plastic material Teflon. This is sometimes done by inserting a Teflon block in the die block, and sometimes by facing the extrusion surfaces with Teflon sheets.

The result is to reduce friction, slightly increase press capacity, and create an exceptionally smooth and almost glossy surface. This is apparently the source of the appearance you have noted in your competitors' products.

For further information you might contact Ambrette Machine Co. or De Francisci Machine Co., Brooklyn, N. Y.

## Curbing Accidents

*Question—The number of injuries in our plant has taken a sharp upward climb during the past year. It's actually reached the stage where we must take drastic action to stem these accidents. Before proceeding, however, we'd like to enlist your aid in the form of suggestions.*

Answer—First thing is to set up an accident-prevention program in your plant. But before such a program can become successful, it should have full cooperation of the entire personnel—top management and factory workers alike.

Workers must have a complete understanding of an industrial safety program. They should have preconceived ideas about safety, and acquire the right attitude toward a job and its hazards.

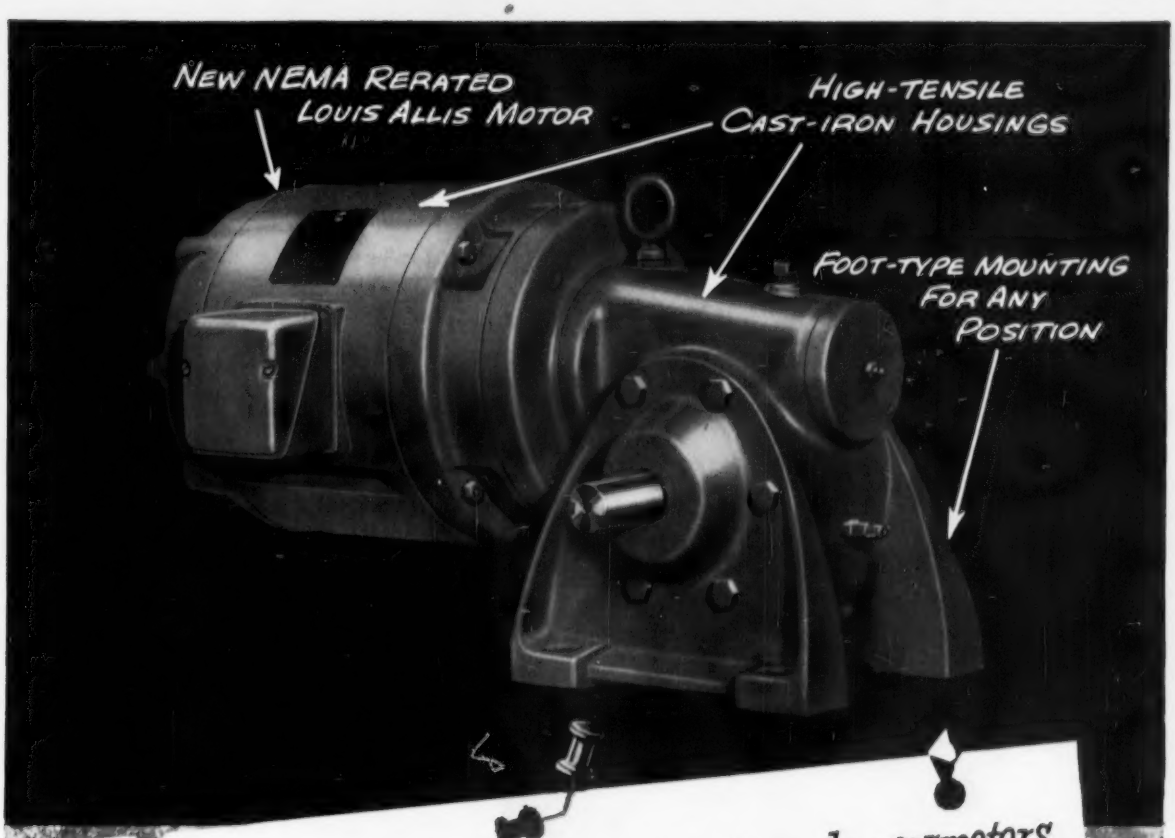
Such a safety program might comprise a general safety committee, chairmaned by the plant manager, engineer, superintendent, etc. And this committee could, to be more effective, be made up of a number of sub-committees like inspection and investigating committees. You be the judge of the number making up these committees.

A few specifics about these committees. Duties of a general committee might cover:

1. Instructing all employees on safety practices.

2. Stimulating safety practices through use of literature from National Safety Council; strategic spotting of signs, posters, and slogans throughout the plant; and making appeals to supervisors and workers.

3. Teaching new men the haz-




# *Louis Allis announces its L.A. line of right-angle gearmotors*

## Now available with new NEMA rerated L.A. motors for all applications — in sizes from 1/3 to 30 hp

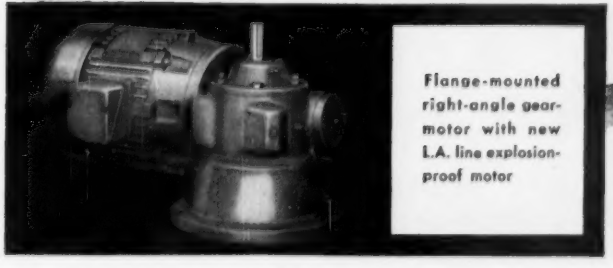
Before we go into the many design features of this compact gearmotor, let's take a look at a few other advantages:

First of all, you can get either foot- or flange-mounted units. Secondly, you can have any motor enclosure you want. And finally, you can have any electrical or mechanical modification needed for any specific application.

In other words, here's a line of gearmotors ruggedly designed, versatile and efficient — to give you a sound answer to your right-angle gearmotor drive problems. Here's why:

- Both gear and motor housings are made of high-tensile cast iron to provide maximum strength, rigidity, and compactness.
- The worm, carefully machined from hardened alloy steel, is ground to close tolerances to give greater efficiency and longer life.
- The worm gear is cut from a high grade of wear-resistant alloy bronze.
- A double-row angular contact bearing and a ball bearing provide for radial and thrust loads on the worm shaft.
- The output shaft is mounted in tapered roller bearings for maximum load-carrying capacity.
- Ample oil-bath lubrication assures longer life and minimum maintenance.
- Special oil seals on all shafts keep the oil in -- dirt out and permit any mounting arrangement.

Here's a line of right-angle gearmotors that's very easy to apply. Standard speed range from 7-1/2 to 300 rpm -- special speeds also are available.



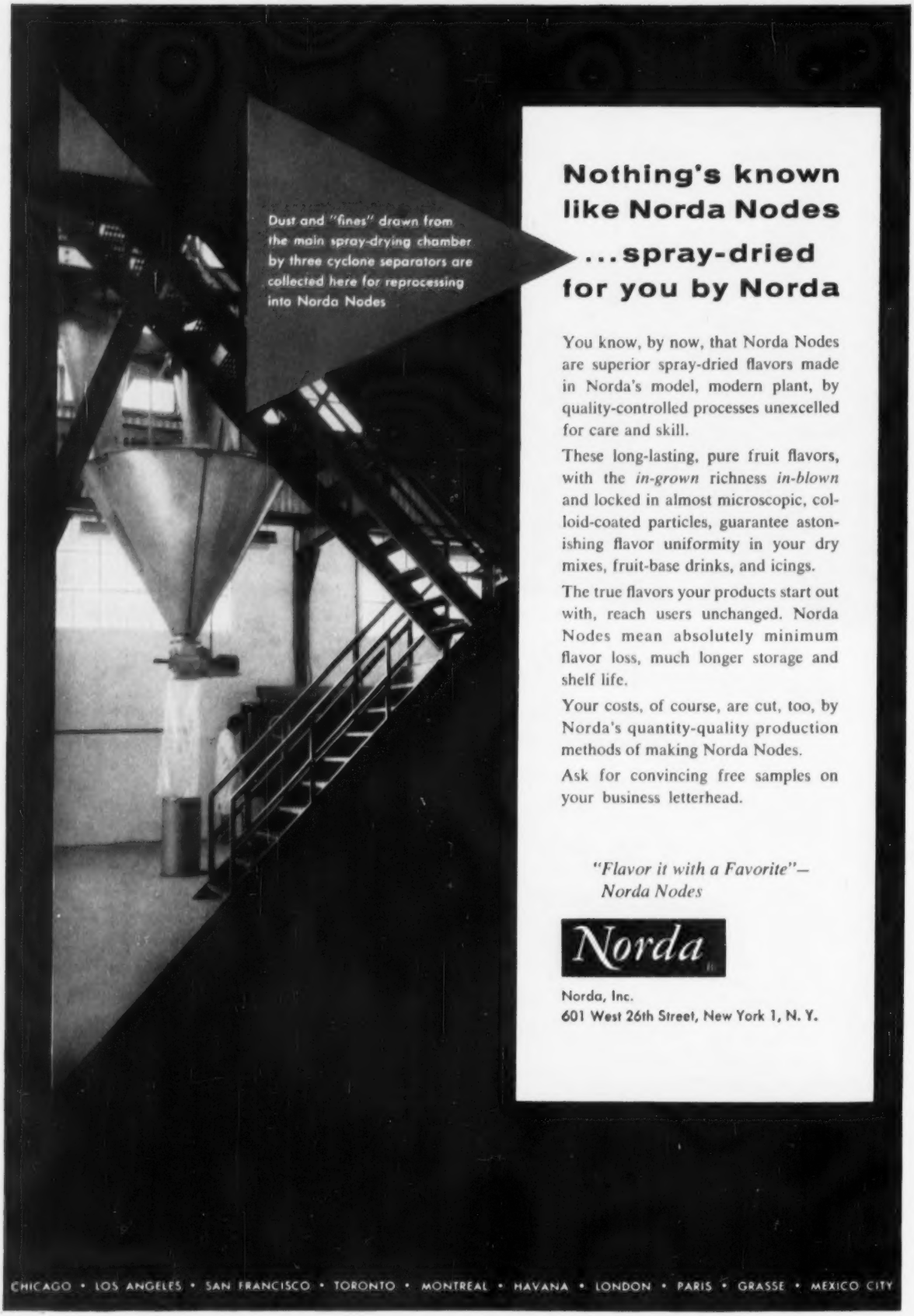
Flange-mounted right-angle gearmotor with new L.A. line explosion-proof motor

GM-103

**THE LOUIS ALLIS CO.**
MILWAUKEE 7, WISCONSIN



For more data, circle this page number on card at back →



Dust and "fines" drawn from the main spray-drying chamber by three cyclone separators are collected here for reprocessing into Norda Nodes

## Nothing's known like Norda Nodes

## ...spray-dried for you by Norda

You know, by now, that Norda Nodes are superior spray-dried flavors made in Norda's model, modern plant, by quality-controlled processes unexcelled for care and skill.

These long-lasting, pure fruit flavors, with the *in-grown* richness *in-blown* and locked in almost microscopic, colloid-coated particles, guarantee astonishing flavor uniformity in your dry mixes, fruit-base drinks, and icings.

The true flavors your products start out with, reach users unchanged. Norda Nodes mean absolutely minimum flavor loss, much longer storage and shelf life.

Your costs, of course, are cut, too, by Norda's quantity-quality production methods of making Norda Nodes.

Ask for convincing free samples on your business letterhead.

*"Flavor it with a Favorite"— Norda Nodes*

Norda®

Norda, Inc.
601 West 26th Street, New York 1, N. Y.

CHICAGO • LOS ANGELES • SAN FRANCISCO • TORONTO • MONTREAL • HAVANA • LONDON • PARIS • GRASSE • MEXICO CITY

ards of their jobs and methods of avoiding injury.

4. Circulating safety literature and posters to all department heads.
5. Investigating all first aid reports.
6. Checking all accidents with the investigating sub-committee and making certain corrective measures are taken.
7. Making daily plant inspections to check on hazards and unsafe practices.
8. Keeping up-to-date safety bulletin-boards and inspection reports.
9. Maintaining a fully-equipped first aid room, staffed by a registered nurse.
10. Providing courses in first aid.
11. Employing special incentives like prizes to promote safety.
12. Enlisting aid and advice from top management.
13. Determining safe practices and regulations for certain jobs.
14. Recommending protective clothing, equipment, and devices.
15. Soliciting suggestions from workers.

It would now be a good idea to schedule monthly meetings for the general committee. Such meetings must not be postponed, and attendance must be compulsory.

Topics discussed by this committee might include a review of first-aid and accident reports for the previous month, discussion of problems and hazards, determination of corrective measures to be taken, and recommendations.

The inspection sub-committee should periodically tour the plant and check for poor housekeeping, slippery floors, unprotected equipment, defective tools, and other potential hazards. Written reports must then go to the general committee.

As for the investigating sub-committee, it looks into all accidents, along with the department head. Corrective measures, determined at the scene of an accident, and suggestions might then be submitted to the general committee.

---

**Q.—Do you have a Salami Cotto formula?**

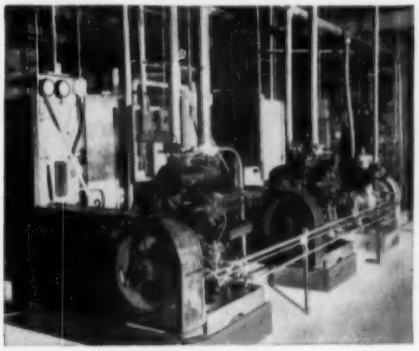
**A.—Here's one: Boneless chucks, 60 lb.; pork cheek meat, 25 lb.; regular pork trimmings, 15 lb.; fresh garlic, 3 oz.; cure (sodium nitrate, 3 lb. 7 oz.; sodium nitrite, 5 oz.; and dextrose, 10 lb.), 2¼ lb.; salt, 3 lb.; cold water, 6 lb.; nonfat milk solids, 4½ lb.; black pepper (ground), 7 oz.; and cardamon (ground), 2 oz. Formula by American Dry Milk Institute.**

---

## Famous Puffin Biscuits Made and Kept Fresh With Frick Refrigeration

**The new million-dollar plant of Ready-to-Bake Foods Inc., at Charlotte, N.C., cools its entire output of Puffin Biscuits with three "ECLIPSE" refrigerating machines. Storage temperatures are in the low 30's. A fourth Frick compressor cools the jackets of the dough mixers. Installation by Piedmont Engineering Corp., Frick Distributors at Charlotte.**

**Just how refrigeration is applied to widely varying industries in the Carolinas is explained in a recent Frick publication. Write for your copy.**



*Four Frick Refrigerating Machines, with full-automatic controls, in service at Ready-to-Bake Foods Inc., Charlotte, N.C.*

FRICK CO. WAYNESBORO, PENNA. U.S.A.

NEW! FREE!

Learn how 35 manufacturers cut costs by using Cyclone Processing Belts. You'll find the whole story in this brand new, free booklet just off the presses. We've carefully selected thirty-five different cases from our files covering many fields of product processing. Chances are, you'll find an example of cost-cutting that could be applied to your own operation. Take advantage of this opportunity to find out how others slashed production costs with Cyclone Belts. Simply fill in and mail the coupon for your free copy of this informative booklet.

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AMERICAN STEEL & WIRE DIVISION
UNITED STATES STEEL CORPORATION
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UNITED STATES STEEL




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# PROVEN PERFORMANCE

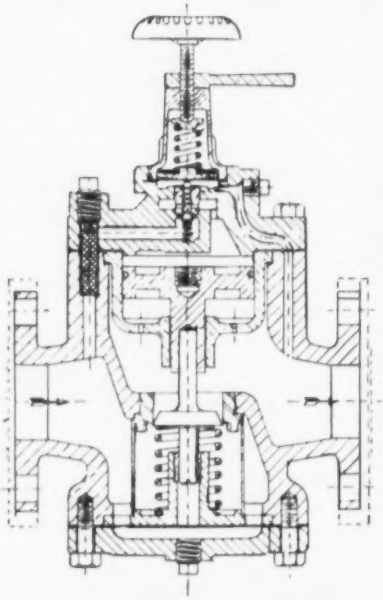
## at A. E. STALEY Mfg. Co.

# CASH STANDARD Type 44

### Pressure Reducing and Regulating Valve for Steam Service

Sudden changes in the requirements for hot water in the employees' shower rooms at the **Staley** plant demand full capacity range operation of the regulating valve with precise control of downstream pressure.

In April of 1956, a CASH STANDARD Type 44 Steam Valve was installed in the line supplying steam to the heater. **Gerald Hammond**, instrument engineer at **Staley**, reports: "The CASH STANDARD Type 44 has given exceptionally good service—the kind of service we expect from all CASH STANDARD products. It has required no maintenance since installation eight months ago."



What's your control problem? Use this dependable steam valve.

**Built in Pilot and Main Valve Strainers • Internal Pilot-Operated, Piston-Actuated • Single Seat • Highly Sensitive, Responsive to Smallest Changes in Reduced Pressure • Maximum Inlet Pressure 250 PSI @ 400°F. • Delivery Pressure 5-250 PSI • Available with External Sensing Line • Sizes 2", 2½", 3", 4".**

For an individual solution to your control problem, contact the CASH STANDARD specialist in your area, or write Dept. G.

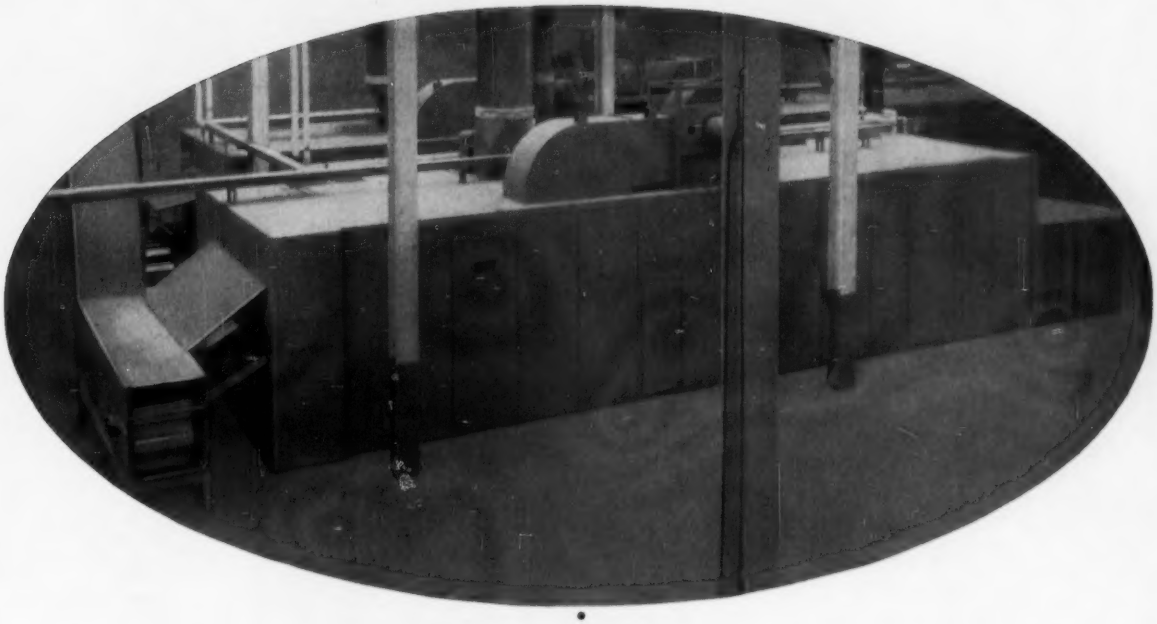
**CASH** C S **STANDARD**

**A. W. Cash Co. and Its Subsidiary, Cash Standard Stacon Corp.**
**P. O. Box 551, Decatur, Ill.**

PRESSURE, HYDRAULIC, TEMPERATURE, PROCESS AND COMBUSTION CONTROLS

# PROCTOR DRYERS

## *for high product uniformity – more profit!*



**PRODUCT UNIFORMITY** is of utmost importance to every food processor, at all stages of processing. The Proctor continuous conveyor dryer installation shown above is located in a plant of one of the world's largest food manufacturers—typical of many in use in the food industry today. In this plant Proctor Dryers assure uniformity of color, taste, and high customer appeal—yields are greatly increased!

**WITH UNIFORMITY COMES PROFIT.** Efficient drying per pound of product can often mean more direct profit than an increased sales volume. Proctor equipment provides the control, flexibility and construction features *essential* to profitable drying performance. Write or phone today for complete information.

**INCREASED YIELDS**

**GUARANTEED QUALITY OF PRODUCT**

**FLEXIBILITY**

**PROFITABLE OPERATION**

**OTHER PROCTOR DRYING EQUIPMENT FOR THE FOOD AND PROCESS INDUSTRIES**

**TRAY DRYERS • TRUCK DRYERS**
**PRE-FORMING FEEDS • SPRAY DRYERS**

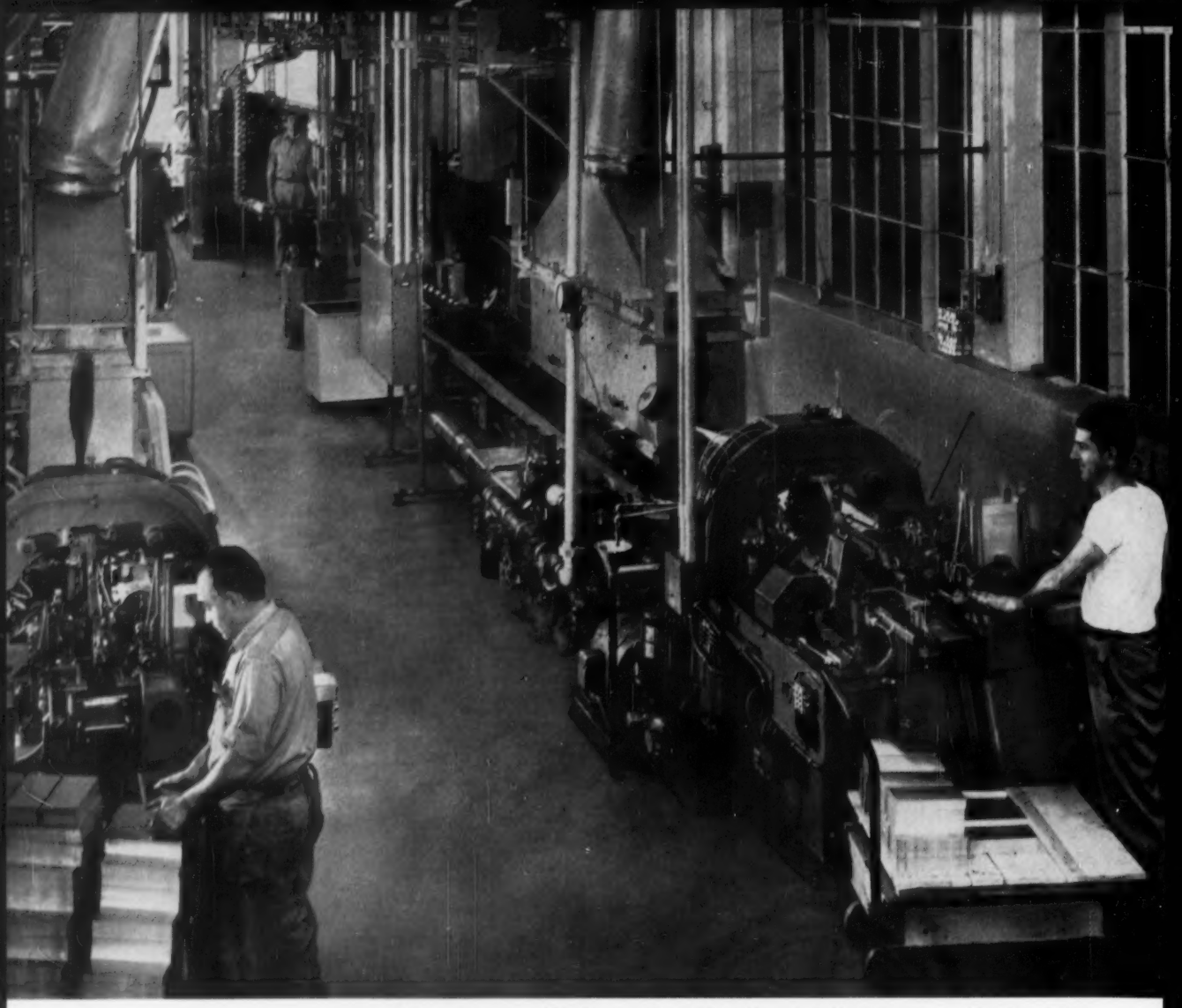
Proctor

**PROCTOR & SCHWARTZ, Inc.**

MANUFACTURERS OF INDUSTRIAL DRYING EQUIPMENT AND TEXTILE MACHINERY
Philadelphia 20, Pa.



For more data, circle this page number on card at back →



Above are two new Hamilton can bodymaking lines, including the new 501 Hamilton Bodymaker and Soldering Machine units, recently installed at Hershey Chocolate Corp., Hershey, Pa.

# Newly designed can bodymaker cuts down on shutdown time

Hamilton's newly designed No. 501 Bodymaker and Soldering Machine represents the latest development in can making equipment. One of its many features is a central drive shaft, which means less linkage, lower maintenance costs, and shutdown time reduced to a minimum. All crank-actuated motions are from this central drive shaft. Automatic stops are provided throughout as a safety feature if a jam should occur.

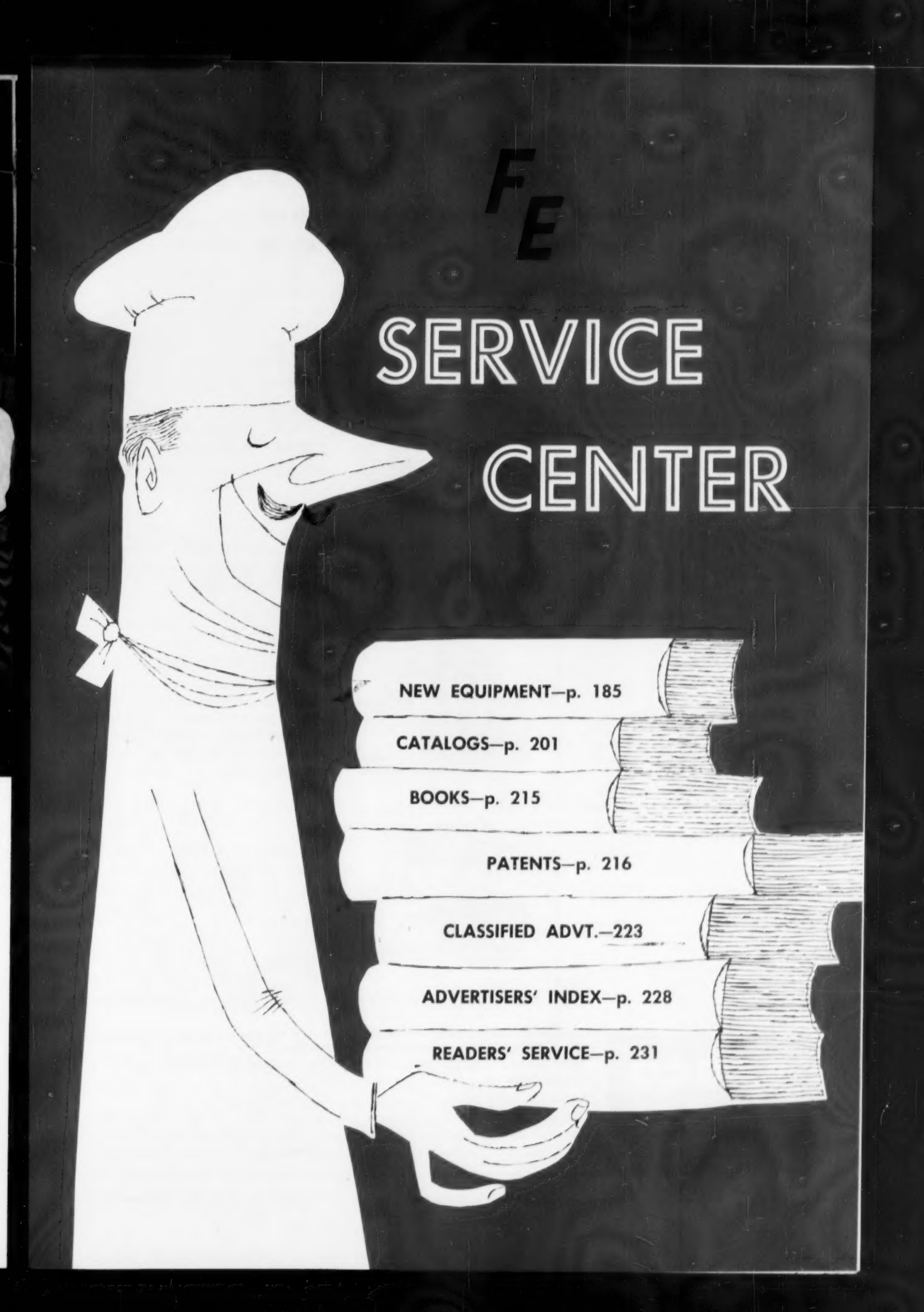
Stop in at Booth 15 at the Canners' Show, Feb. 16-19, Conrad Hilton, Chicago. Get firsthand information on the Hamilton 501; see for yourself its big possibilities in making your operations more profitable. And at the same time get a better understanding of the world's most complete line of can machinery.

**Hamilton Division** Hamilton, Ohio

BALDWIN · LIMA · HAMILTON

Diesel engines • Mechanical presses • Can making machinery • Machine tools

BALDWIN BLH LIMA-HAMILTON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CENTER
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# How it Works!

## Only new Sarco TD steam trap uses kinetic energy of steam to close valve

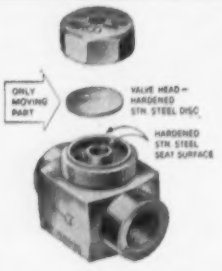
GAS MANTLES have been replaced by electric lights, steam locomotives by diesels, propeller planes by jets.

*Now*, the use of the kinetic energy of steam principle gives us a modern type of steam trap.

The Sarco TD obsoletes all other types for most 10 to 600 psi installations. For example, it operates without a valve closing device—no bucket, float, bellows, pins, levers or gaskets.

*Glance below* and you'll agree that no other steam trap is even similar to the Sarco TD!

*For a trial installation—write today.*



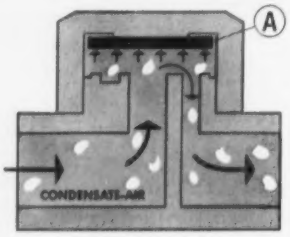

**Only 3 parts... all stainless steel**

Sizes ⅜ to 1"—each body is as small as a tee fitting! Capacity is determined not by a bulky body but by the effective orifice, valve action, pressure drop and condensate temperature.

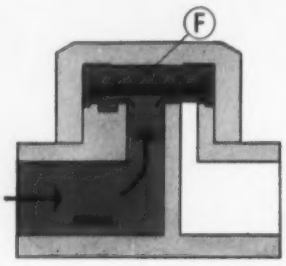
### Many Advantages

1. *Practically no maintenance*—no valve mechanism, no narrow channels. Trouble-free simple design. Only 3 parts—all stainless steel.
2. *One trap for all pressures*—self-adjusting. One large capacity seat for 600 psi as for 10 psi. No changes or adjustments.
3. *Operates equally well on all loads*—on heavy, light or no condensate load. No prime to lose. No adjustments.
4. *No steam leak required*—to operate the Sarco TD. Closes tight against steam.
5. *Discharges at steam temperature and vents air* and air-steam mixtures at start-up and during operation.
6. *Freeze-proof*—when installed with outlet down, free to drain.

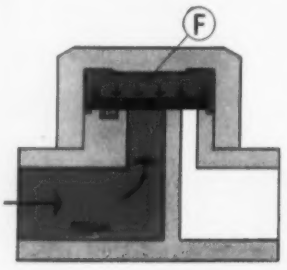
**Only Sarco TD Thermodynamic Steam Trap Uses This Unique Operating Principle Which Permits Trouble-Free TD Design**




**1.** Inlet pressure raises disc "A" from seat... immediate discharge of air and condensate at steam temperature.




**2.** Steam follows the condensate and the high velocity jet across the bottom of disc "A" creates a low pressure area (Bernoulli effect)... the jet is deflected into chamber "F" where it builds up pressure by recompression and this pressure acts on the top of the disc "A"...




**3.** Pressure in chamber "F", acting on full top area of disc "A", exceeds force of incoming steam and low pressure area under the disc... and immediately forces it down, closing the inlet. As condensation decreases the pressure in chamber "F", the disc rises and steps 1 or 2 repeat.

***60-day trial convinces... No obligation... Use coupon!***

**SARCO**

Steam Traps—Temperature Regulators—Strainers—Heating Specialties

**SARCO COMPANY, INC., Empire State Bldg., New York 1, N. Y.**

Please send me Sarco TD Steam Trap and strainer for 60-day trial. Size_____

For installation on_____

Name_____ Title_____

Firm_____

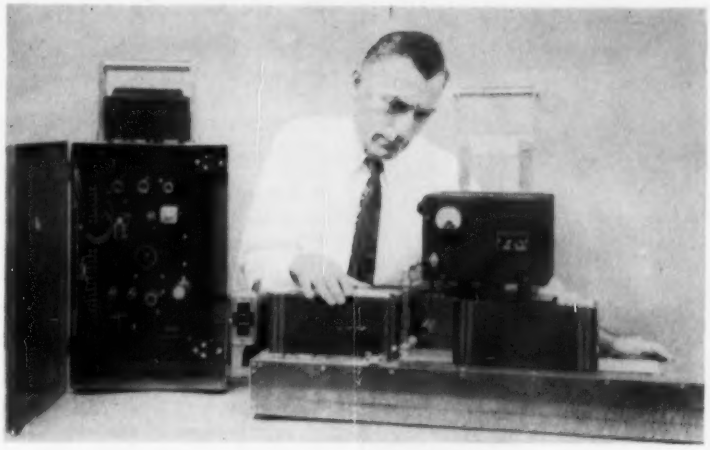
Address_____

City_____ State_____

2184-C

CUT OUT AND FILE

# NEW EQUIPMENT & SUPPLIES



## Electronic Unit Checks Packages For Variety of Defects

Any package containing a material that affects the flow of high-frequency current may be efficiently checked on the production line with this new electronic inspector.

Typical applications include checking for proper weight and product level, for presence of a cap, or for inclusion of a premium item.

Operation of unit (Package Inspector) depends on high-frequency current passing through the entire package. All materials respond to this current in proportion to their electrical properties, and to the volume of materials present. Since some items conduct more efficiently than others, it is sometimes possible to single out certain materials inside a complicated package to determine if they are present in the proper quantity, while ignoring other components.

Here are some of the unit's specific applications:

**Crackers**—Sort out and remove from conveyor all packages which have less than the proper number of wax-wrapped inserts. Or to remove all underweight packages.

**Spices**—Remove packages which are underweight, or those which have full weight but are not filled to the proper appearance level.

**Breakfast Cereal**—Eliminate packages not filled to proper level, regardless of weight.

**Bottled Liquid in a Carton**—Sort out cartons not having correct number of bottles, or in which a bottle is not full.

**Liquid Level in Cans**—Inspect and sort out cans not having proper liquid level prior to sealing.

**Polyethylene-Bagged Items**—Remove bags having less-than-normal contents by weight, bulk, or type.

Principal categories of products which cannot be checked in this manner are metal containers which are closed on all sides, non-uniform packages for items such as bananas and fruits, and randomly distributed packages.—*Photo-Bell Sales Corp., 43 Vesey St., New York City.*

Circle 185A on Reader Service Card

## Swivel Nozzle Permits Fast Bulk Loading

Designed to speed pneumatic loading of bulk materials, such as flour, into maker's rail cars and vans, this swivel nozzle consists of a bent aluminum tube (about 2-ft. long, 3-in. dia.) fitted into the center of a standard or custom-built aluminum hatch cover.

Equipped with a rubber gasket, the cover offers an air-tight seal to prevent escape of powdery product being loaded. Unit reportedly enables maximum loading of material and even distribution from one loading point. Thus, there is no need to move the car to position various hatches under it.

In loading, operator fits the nozzle into the hatch opening. After securing the cover, he aims the nozzle to one end of the car. This is done with a 4½-in. handle on the straight section of pipe, which can be turned 360 deg.—*Fuller Co., Catasauqua, Pa.*

Circle 185B on Reader Service Card

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## Forms Case, Loads Cans At 15 Cases/Min.

Automatic case-loading of canned goods at 15 cases per min. is reported with use of a new feeder-former-positioner-loader unit, with container magazine.

Machine employs end-opening style, corrugated paperboard shipping containers, and loads either 12-46 oz. cans or 6 No. 10s. Casing is accomplished with one part-time

operator who keeps the magazine supplied with knocked-down containers. In addition to the easier loading and greater strength of end-opening containers, maker estimates a 15% saving in paper board.

Unit can be adapted to discharge a loaded case to a top and bottom case sealer or a side sealer. Container is then ready for shipment. A convertible end-loading component may be purchased separately without the feeder-former-positioner operation. In that case, a full-time operator is required to form and place a corrugated shipping container on the loading horn.—*J. L. Ferguson Co., Joliet, Ill.*

Circle 185C on Reader Service Card

## Delivers Accurate Spray Of Graphite Lubricant

Here's a handy container and gun that dispenses fine-powdered graphite lubricant for metals, rubber, wood, and leather. Product reportedly does not run, drip, freeze, melt, or dry out.

Known as Blaco, unit is small enough to hold in the hand, and sprays while held in any position. It contains enough graphite for several thousand applications. A rubber "squeeze-type" bulb, attached to the container, provides an easily directed spray.

A light squeeze on the rubber bulb, with nozzle head close to the object, accurately delivers a light or heavy spray. Large areas up to 100 sq. in. are easily covered by full finger-tip pressure. Area that is covered and output of spray are determined by distance of nozzle from object and pressure exerted.—*Servwell Products Co., 6541 Euclid Ave., Cleveland 3.*

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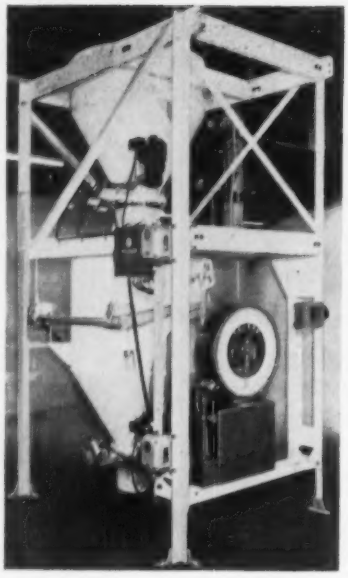

## Automatic Weigher Offers Remote Data Recording

Batching of flour may be sped and simplified with a new automatic system offering—

- Accurate repeat weighing by compensating for material adhering to the hopper.
- Automatic listing and totalling of weights.
- Remote location of adding machine and operating controls.

Capacity of the unit is 40,000 lb. per hr. with drafts of 1,000 lb. However, it may be varied to meet individual requirements. An operating station can be mounted near the scale or in a remote office area. It includes switches, pilot lights, and a counter for setting the number of drafts to be delivered.—*Toledo Scale Co., Toledo 1, Ohio*

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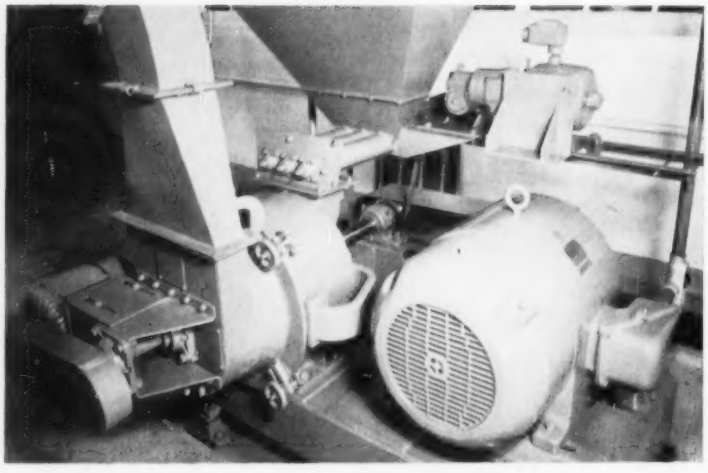

## Efficient Pulverizer Has New Operating Principle

Combining controlled air attrition and impact with radial inward classification, this new pulverizer offers highly efficient operation in the sub-sieve range (below 325 mesh). Typical applications include grinding of sugar, cocoa, and cereal products.

In processing sugar at 600-800 lb. per hr., unit (Pulvocron) produces a material with at least 99.9% of its particles under 325 mesh. Power consumption is 40 hp. Furthermore, its classifier can be adjusted to boost this production to 1,300 lb. per hr. (99.7% under 325 mesh), which requires 60 hp.

Grinding and classifying rotors are encased in a single housing. However, each are run at different speeds, a factor contributing to high efficiency. Particles are classified by inward movement against centrifugal force to effect close cuts.

Machine has a 20-in.-dia. chamber which takes up to 75 hp. on the grinding side and uses a 3-hp. classifying motor. Also required are a ¼-1 hp. feeder motor, and up to a

10-hp. exhaust-fan motor on the dust-collection system.

Maximum feed size is ¼ in. Mill temperatures range to 155F., product reaches about 135F.—*Strong-Scott Mfg. Co., 435 Taft St., N. E., Minneapolis.*

Circle 186C on Reader Service Card

## Sanitary Valve Provides Foamless Can Filling

With this new valve, a 40-qt. milk can may be filled in 20 sec.—without foam or product waste.

Known as "Foam-Master," it handles whole or skim milk, cream, and mixes. Unit attaches to the canning-off line, hence takes up no floor space. Of stainless steel, it has few moving parts and is especially designed for easy take-down and fast cleaning.—*DeLaval Separator Co., Poughkeepsie, N. Y.*

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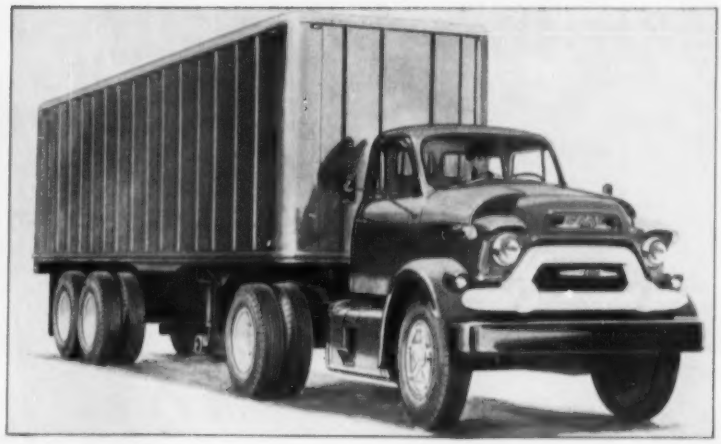
### Want More Information?

**It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service Postcard — back of book. Then sign at the bottom and mail.**

**For your convenience, too, items in this department are listed and keyed in the Reader Service Section.**



## New Tractors Have Cost-Cutting Construction

Greater operating economy is reported for the 16 models of this '57 line of highway tractors equipped with air suspension, lightweight aluminum construction, and turbo-charged diesel engines.

Gross vehicle weights range from 25,000-42,000 lb., and gross combination weights from 50,000-65,000 lb. Heavy-duty front and rear axles are available on most units to increase payload. Tests indicate that air-suspension design permits a 3-8% increase in trailer cargo capacity. Also, it reduces vehicle weight; eliminates spring lubrication, repair, and replacement; simplifies loading and unloading through constant floor height; ends spring noise; and provides better load distribution.

Furthermore, smooth riding qualities of this suspension tends to lessen driver fatigue; reduce cargo breakage; decrease chassis, cab, and body maintenance; and permit less expensive packaging of cargo.

Except in tandem-axle models, each air-suspension unit has 6 rubberized bellows, 4 in front and 2 over the rear axle. Tandem units have 4 in the rear. Vehicles' air compressors feed the bellows, and leveling valves automatically control their inflation to maintain constant vehicle height.

Buoyancy of the pressurized air replaces leaf springs in absorbing road jolts and high-frequency vibrations. Various stay bars, torque rods, and sway bars position the axles. All linkage is mounted in rubber, which eliminates lubrication.

Turbo-charged diesels use energy in exhaust gases that normally would be wasted. A turbine, driven by escaping gases, draws fresh air through a cleaner, and delivers it at above-atmospheric pressure to inward side of engine blower. This boosts specific power output, cuts fuel consumption and maintenance cost by providing better combustion and quieter operation.

Coupled with all diesels are hydraulically-driven fans that provide increased fuel economy and more usable horsepower. When engines cool, fan slows down, or even stops, to cut power drain from engine. It goes back automatically when engine cooling is needed.—*General Motors Corp., Truck and Coach Div., Pontiac, Mich.*

Circle 187B on Reader Service Card

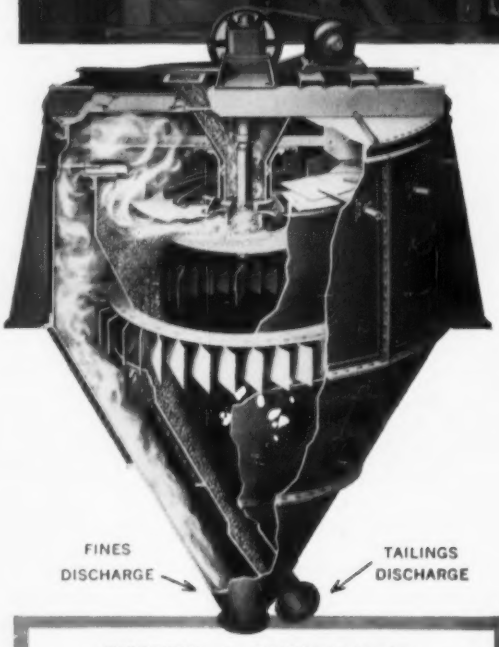
## New Paperboard Pallets Cut Shipping Costs

Seen at left is the tray-type unit of a new line of expendable paperboard pallets designed to cut handling costs for materials shipped in bags, cartons, or in bulk. Although

# Soybean Dust Problems Solved by Sturtevant Air Separator

**RIGHT:** Spencer Kellogg & Sons employee making classification adjustment on Sturtevant Air Separator in operation at Bellevue, Ohio, soybean meal plant. Separator minimizes air-borne dust losses while removing hulls and classifying end product.

**LEFT:** Two lead-off chutes at bottom of Sturtevant Air Separator in Spencer Kellogg & Sons plant. One chute in the closed circuit system sends to packaging all uniform size, dust-free meal while the other returns all undersize fines for pelletizing.




## Closed Circuit Air Separation Cuts Losses, Keeps Plant Cleaner, Improves End Product

Dust — finer than 80 mesh — was accounting for 4 to 5 percent of the soybean meal production at the Spencer Kellogg & Sons plant in Bellevue, Ohio. Much of this dust was disseminated into the air during processing, becoming a total loss. And such free dust made working conditions unpleasant, plant and storage sheds untidy in appearance. Also, the proportion of dust retained in the end product was an annoyance to farmers and ranchers.

All of these problems have been solved by a Sturtevant Air Separator operating in closed circuit with a pelletizing machine. The processed soybean meal goes through the Air Separator at the rate of about 85 tph. Particles representing dust and hulls go out the fines chute to the pelletizer. The pellets are then ground and re-circulated through the Air Separator at rates to 10 tph, bringing the machine's total capacity to 95 tph.

The net result is that Spencer Kellogg & Sons now has cut dust loss to a minimum, no longer has any air-borne dust problems, and is producing a better standardized, dust-free end product. Sturtevant, the pioneer in centrifugal air separation, has once again helped to solve a precision classification problem — *and without an expensive, multi-unit installation.* Write today for more information. Address: Sturtevant Mill Co., 106 Clayton St., Boston 22, Mass.

### THERE'S A STURTEVANT FOR EVERY CAPACITY

No other single air separator can match Sturtevant's 40 to 400 mesh classification range at rates up to 100 tph. . . . and tested record of increasing mill capacities from 25 to 300% while lowering power consumption as much as 50% (when used in closed circuit with grinding mills). Nine models available, ranging from 3 to 18 ft. in diameter. Request Bulletin No. 087.

# STURTEVANT

## *Dry Processing Equipment*

**The "OPEN-DOOR" to *lower* operating costs over *more* years**

CRUSHERS • GRINDERS • MICRON-GRINDERS • SEPARATORS
BLENDERS • GRANULATORS • CONVEYORS • ELEVATORS



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weighing only 5 lb., they offer capacities to 2,000 lb. and may be stack-loaded 4-high.

Pallets (Model P) are purchased as needed, which eliminates the costs of storage and inventory control. Delivered knocked down, they are quickly assembled and handled as are wooden pallets. The tray lip secures the load, cushions it, and prevents possible shifting of products in transit.

Units come in three models with capacities of 1,000, 1,500, and 2,000 lb. Seven sizes for each model range from 36x36 in. to 48x48 in. Also available are fire- and moisture-resistant types.—*Titan Pallet Co., 527 Madison Ave., New York City 22.*

Circle 187C on Reader Service Card

## Stackable Ingredient Pails Are Sanitary, Durable

New aluminum ingredient pails, designed to meet rugged handling and sanitary requirements of food processors, are available in capacities of 24, 30, and 36 qt.

Units have double strength at critical wear points and large handles for quick, easy moving and stacking. A corrosion-resistant finish and closed beaded edges facilitate cleaning.—*Harlow C. Stahl Co., 1375 E. Jefferson, Detroit 7.*

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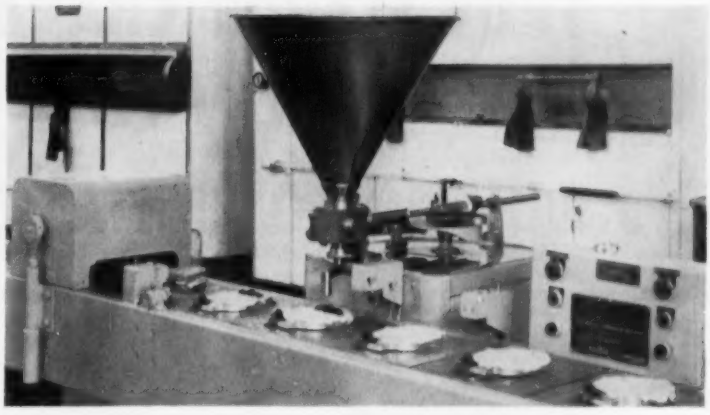

## Automatically Forms, Fills, and Trims Turnovers

Designed for continuous-automatic production of turnovers, this machine fills, forms, seals, trims, and delivers them to a conveyor. Product is then ready for further processing by frying, baking, or freezing.

Equipment (Ever-Rite) is available with single or twin aluminum dies, which produce 1,500 and 2,500 units per hr. respectively. A stainless filler handles a variety of fillings (fruits, chicken, meat, chili), and deposits a metered amount in each crust. Changeover from one filling to another is said to be quick and easy.

Forming and sealing are performed by the dies, after which turnovers are trimmed and deposited on a plastic-coated belt. Dough trimmed from the product is automatically deposited in a stainless container, and protected for re-use by a plastic housing. A maximum of three operators handles any type of production.

In addition to the filler, all components (motors, compressor, switches, controls) are integrated into the unit, which requires only one power connection at a central control panel.—*American Products Co., 1501 Good-Latimer Expressway, Dallas 10, Tex.*

Circle 189B on Reader Service Card

## Efficient Pipe Insulation Has Wide-Temp Range

Said to be strong, wear-resistant, and easily installed, this low-conductivity insulation withstands pipe temperatures to 1,350 F.

Product (Kaytherm) is a hydrous calcium silicate bonded with asbestos fibers. It comes in half-cylinders, 36-in. long, to accommodate pipes to 33-in. dia. Thicknesses range 1-4 in. Metal bands fasten the two mating sections to a pipe, and material can be worked with ordinary tools.—*Keasbey & Mattison Co., Ambler, Pa.*

Circle 189C on Reader Service Card

## OTHER DEPARTMENTS Featured in This Issue


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# TRUE FLAVOR CHARACTER AT LOW COST Yours with DOLCO® IMITATION FLAVORS

Check the chart below! See what unusual economies are available with the highly concentrated, true to type DOLCO FLAVORS.

| DOLCO FLAVOR | PROPORTIONS and APPLICATION | PRICE PER LB. |
|---|---|---|
| BANANA | HARD CANDIES | $2.50 |
| BUTTERSCOTCH | ½ to 1 oz. to 100 lbs. | 3.75 |
| CHERRY, RED | FONDANTS & CREAMS | 5.75 |
| COCONUT | ¼ to ½ oz. to 100 lbs. | 4.25 |
| GRAPE | PECTIN JELLIES | 3.75 |
| PINEAPPLE | ¼ to ½ oz. to 100 lbs. | 4.00 |
| RASPBERRY | STARCH-GUMS | 7.75 |
| STRAWBERRY | 1 to 1½ oz. to 100 lbs. | 3.75 |

The above listing is but representative. Many other important flavors are also available in the popular DOLCO LINE. Trial quantities on request to you D&O representative.

*Essentially for you*

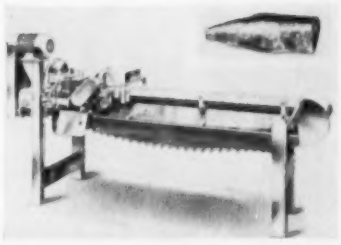
D&O
ESTABLISHED 1798

*Our 158th Year of Service.*

ESSENTIAL OILS
AROMATIC CHEMICALS
PERFUME BASES
FLAVOR BASES
DRY SOLUBLE SEASONINGS

*Write for a copy of the new Reference Book and Catalog of Flavors and Seasonings.*

**DODGE & OLCOTT, INC.**
180 Varick Street, New York 14, N. Y.
Sales Offices in Principal Cities



## New Nobbing Unit Handles 180-300 Fish Per Min.

Most small or medium-sized herring and mackerel-type fish may be gutted and decapitated automatically in this new nobbing machine. An optional attachment removes tails and/or cuts fish into chunks.

Unit's conveyor is available in four-fish-pocket widths, and has feeding space for two attendants. However, the two larger conveyor sizes may be lengthened about 3 ft. to accommodate up to four feeders. Output varies from 180-300 per min. Standard dimensions: 8 ft. length, heights 2 ft. 2 in. and 3 ft. 8 in.

Of stainless construction, machine has enclosed gear box and water-jet flush cleaning.—*Arenco Machine Co., 25 W. 43rd St., New York City 36.*

Circle 191A on Reader Service Card

## Portable pH Recorder Has Many Applications

Field surveys of stream pollution, plant effluent, and industrial water supplies may be simplified with this portable, self-contained pH-measuring and recording instrument.

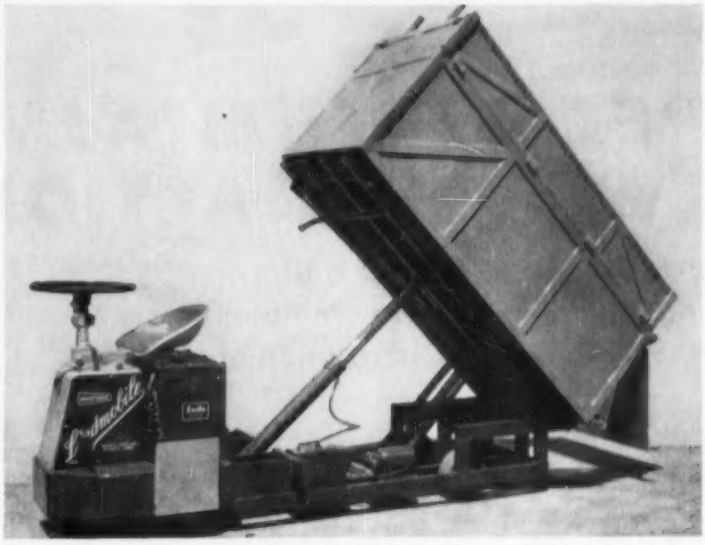
Furthermore, it may also be used for in-plant studies at locations where it is not practical to mount a permanent pH recorder, or where power is not available.

Device consists of two units: A Model 524 pH recorder (Bristol) and an N-2 amplifier (Beckman). It covers the total pH range in two partial ranges of 0-8 and 6-14. Selection is by means of a switch on the amplifier.

Recorder uses carbon-coated 8-in.-dia. rotating charts and a vibrating-type stylus. Charts can be set for one revolution per hr. or per 24 hr. Temperature compensation is made by manual adjustment.

Combined units weigh less than 50 lb. and are compactly arranged for easy transport. Various types of electrodes are available, including those for immersion, flow, and laboratory applications.—*The Bristol Co., Waterbury 20, Conn.*

Circle 191B on Reader Service Card



## Dump Truck Economizes In-Plant Trash Collection

Waste-disposal costs may be cut with use of a new dump truck that consolidates collection operations in one unit. A maximum of three operators handles the job.

Truck (Loadmobile) has a hydraulically tilted dump body that holds about 2½ cu. yd. (1,000 lb. of refuse). Hinged sides enable easy loading and provide additional space when needed. A 45-deg. incline at full tilted position allows refuse to slide out through a large opening made by the end gate. A releasing mechanism at the front permits control either by the driver, or when the body is tilted, by an operator.

Two men may ride safely on folding steps on each side of the driver. This simplifies pickup from either side of aisles. Truck is easily maneuverable in narrow aisles, since length is about 10 ft., width 3 ft.

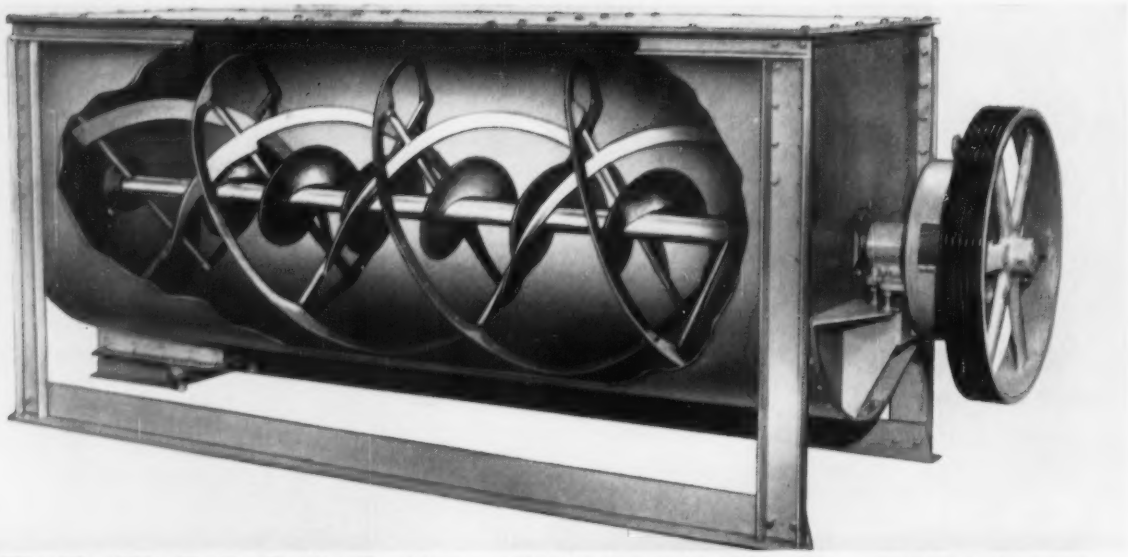
Power is supplied by a 383/405 amp. storage battery, and maximum speed is about 4 mph.—*Market Forge Co., Everett, Mass.*

Circle 191C on Reader Service Card

## Meat-Packing Utensils Washed at 600/Hr.

Efficient washing of pans, ratchet-type pressure molds, and tubes is reported for a new line of washer-sterilizers. Three models offer capacities of 200, 400, and 600 pans per hr.

Utensils are loaded and unloaded at one end of the machine (Custombilt) by one operator, and travel



# PRECISION MIXING WITH NEW TRIPLE ACTION MIXER

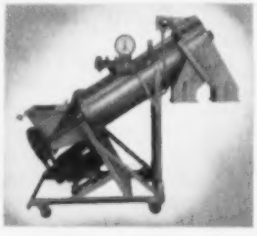
## Strong-Scott Mixer Offers Uniform Blending and Mixing in 2 to 7 Minutes with 99.9% Thorough Distribution of Minor Additives.

Now, for the first time, a batch mixer with exclusive "Triple Action" mixing. The blending, folding and mixing action created by this unique triple ribbon and spiral assembly exposes each particle in the mixture to over 10,000 separate mixing actions per minute. The center spiral breaks and tumbles the core of the mix and moves the material to the outer 2 ribbons which convey the ingredients in opposite directions, subjecting each particle to thousands of mixing actions per minute. This produces a well balanced, uniformly mixed product of the highest efficiency known.

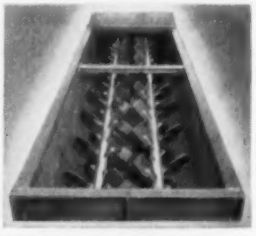
***EXCLUSIVE FEATURE*** — Nylon seals between the tub and shaft, with outboard bearings. This permits cleaning in a matter of seconds . . . is sanitary, long wearing and dustproof. There is no hold up of product from one batch to the next.

The versatile design of the Triple Action Mixer permits feeding from any location at the top with single or multiple discharges to suit individual requirements. Hinged, drop-door bottoms for easy cleanout. Constructed of steel, stainless steel or commercial alloys.

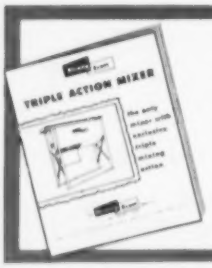
Strong-Scott maintains a complete Customer Service Laboratory with a full line of standard equipment for your convenience, with no obligation to you. Consult Strong-Scott for additional details.



**PORTA-BLEND**—A portable dry mix and liquid blender capable of quality results at high capacity.



**TWIN ROTOR MIXERS**—Accurate blending of liquids and dry mix at high or slow speed.




***WRITE FOR FREE COLOR BULLETIN***

*For complete information on the equipment shown above, write to The Strong-Scott Mfg. Co.*

The **Strong Scott** Mfg. Co.

DEPT. FE-01

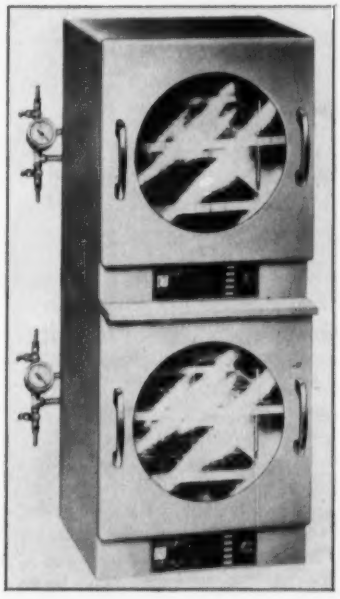
*Equipment Designed for Better Processing*

451 TAFT STREET, MINNEAPOLIS 13, MINNESOTA

through the washing cycle on an endless chain of carrier baskets. Before entering the wash solution, they are contacted by pressure sprays which remove all brown residue, grease, and meat particles.

Two filters continuously screen all paper and meat tissues from pre-wash and solution tanks.—*Niagara Bottle Washer Mfg. Co., 224 First St., Toledo 5, Ohio.*

Circle 191D on Reader Service Card



## Dual Vacuum-Oven Unit Saves Bench Space

Double-deck arrangement of these new vacuum ovens doubles loading capacity with no increase in required bench space.

An insulating deck between ovens (Space Savers) eliminates transfer of radiant heat between units, thus permits them to operate at separate temperatures to 125C. Each chamber (11 in. dia.x12 in. deep) has its own vacuum connection and vacuum gage.

Chambers, of seamless aluminum, have heat-treated glass windows sealed with silicone gaskets. Units have glass-wool insulation, and temperature is thermostatically controlled.—*Labline, Inc., 3070-82 W. Grand Ave., Chicago 22.*

Circle 193A, on Reader Service Card

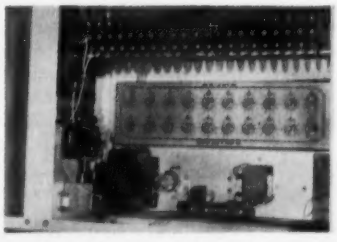
## Sequence-Controlled Unit Automates Poultry Picking

Rapid and efficient automatic picking of poultry is reported with use of a new conveyorized unit.

Known as Cyclo-Mation, it picks 2,500 three-pound chickens per hr., also handles turkeys and game hens. Picking takes place in machine's two hoppers where large pliable rubber fingers, whirling on a central shaft, stroke feathers from birds.

Unit employs 5 cam-operated timers to control the operation. Four of them (upper right) regulate loading of poultry into picking hoppers, the picking cycle, and ejection of birds onto a conveyor. A fifth timer (not shown) serves as an automatic switch for alternating the picking action between hoppers.—*Barker Poultry Equipment Co., Ottumwa, Iowa.*

Circle 193B on Reader Service Card



## Automatic Unit Programs 20 Operations, Intervals

Processes or machines requiring a programmed series of events may be automated by this timed-operation pre-selector, which controls 20 intervals or operations.

Known as No. 200, unit is a time controller employing contacts which open and close independently for any single interval (or operation). Intervals are individually adjustable, automatically following an electric sequence which can be repeated. Shortest time interval is $\frac{1}{10}$ sec.

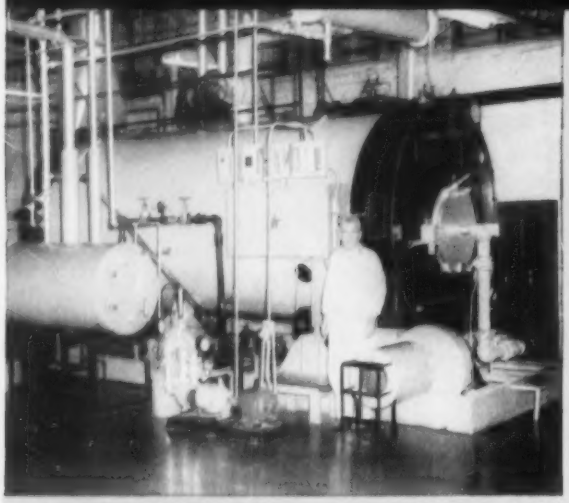
Cams control the on and off periods by means of snap-action switches. Unit operates on 115v., 60 cycles, a. c. Switches have contacts rated at 15 amp., 120-250v., a. c.—*Henry G. Dietz Co., 12-16 Astoria Blvd., Long Island City 2, N. Y.*

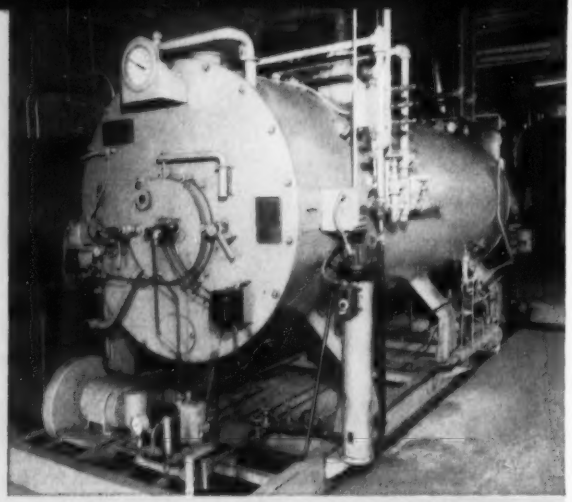
Circle 193C on Reader Service Card

## Compact Digital Indicator Provides Direct Reading

Here's a new panel-mounted instrument that permits direct reading of any variable that can be reduced

# Some Typical Steam Problems Solved by AMESTEAM GENERATOR



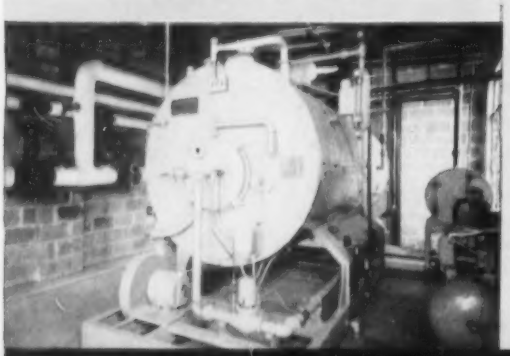


**"... EXTREMELY VARIABLE STEAM DEMAND HANDLED SMOOTHLY AND EFFICIENTLY"** at St. Joseph Paper Company, Houston, Texas. Writes C. J. Christman, Plant Engineer:

"We have an AMESTEAM GENERATOR, 300 HP, 150# W. P. in our plant. It has been in operation since January, 1949. We have an extremely variable steam demand, but this boiler handles it smoothly and efficiently. Practically all the original equipment is still in use and in first-class operating condition. We have never had a leak in our boiler or pipe installation during seven and one-half years of uninterrupted service. The boiler is economical, maintenance costs are very low, and we are completely satisfied."

**"... BEST DOLLAR INVESTMENT WE HAVE MADE TO DATE,"** reports Scranton Wiping Cloth Company.

"... of all the equipment we purchased last year to completely equip our new laundry facilities, which include your 150 HP heavy oil, high pressure automatic AMESTEAM boiler," writes company official L. Light, "we can honestly state that the performance of this piece of equipment has been such that we now consider it the best dollar investment that we have made to date. From a fuel standpoint alone, our records indicate that it is costing us 51.7c per thousand pounds of steam ..." (not counting the maintenance labor savings enjoyed by this firm!).



**"VERY SATISFACTORY"** on lumber dry kilns is the report by J. S. Gudmundsson, Director, Foreign Trade Division of Wood-Mosaic Corporation, describing performance of the AMESTEAM GENERATOR at the firm's New Orleans yard.

"The AMESTEAM GENERATOR we have there for running our lumber dry kilns has operated very satisfactorily, and we would specifically like to comment on the very excellent service that your representative has given us."

**WHAT'S YOUR STEAM PROBLEM?**

If you need 10 to 600 HP and want the kind of space-saving, trouble-free service enjoyed by these owners of AMESteam Generators, write today for our catalog and the name of your nearby Amesteam dealer.

**AMES IRON WORKS INC.**
BOX B-17 OSWEGO, N. Y.

to an electrical quantity—temperature, pressure, flow, load, speed.

Designated Model 756, it incorporates a set of geared wheels which are driven by an electronic null-balance servo system. Indicator numbers are ⅞ in. high and output can be fed directly to printout equipment. Panel area required is 7X7 in. Slide-out chassis allows easy maintenance.—*Performance Measurements Co., 15301 W. McNichols Rd., Detroit 35.*

Circle 193D on Reader Service Card

## BRIEFS . . .

**Liquid-Dispensing Pump** meters 4 oz. per stroke, fits standard ¾-in. opening on all drums from 15-65 gal. Unit is chrome plated to prevent corrosion.—*Multi-Meter Corp., Box 154, W. Toledo Sta., Toledo 4, Ohio.* (195A)

**Air-Tight Separator** eliminates use of collectors, receives milk through spindle for high skimming efficiency. Stainless unit (No. 422) employs only one low-pressure seal at bottom of spindle. Cream and skim milk are discharged (without foam) by two centripetal pumps at top of bowl. Capacity: 22,000 lb. per hr. on hot milk.—*De Laval Separator Co., Poughkeepsie, N. Y.* (195B)

**Outside-Bag Vacuum Cleaner,** which fits any 55-gal. drum, has new propeller design for high capacity in wet or dry cleaning.—*Hild Floor Machine Co., 740 W. Washington Blvd., Chicago 6.* (195C)

**Special Brush** for cleaning bulk-flour rail cars employs nylon bristles bonded to metal brush back. Square-trimmed curved ends prevent scratching even of corners, which curbs rusting of lined cars.—*Fuller Brush Co., Main St., Hartford 16, Conn.* (195D)

**Rotating Forks** (2½-in. dia.) on lift trucks enable dumping of boxes in either direction, also handle pallets. Truck capacity is 1,500 lb. at 36-in. load length; lift height 130 in.—*Lewis-Shepard Products, Watertown, Mass.* (195E)

**Miniature Photocell Unit,** permitting easy installation in confined areas, controls operations at rates up to 600 per min. Typical applications include actuation, counting, inspection, traffic control, and machinery safeguards. Unit operates either from direct beam, reflection from object being controlled, or from mirror reflection.—*Standard Instrument Corp., Photo Control Division, 657 Broadway, New York City.* (195F)

**Strong-Base Anion Exchanger** has particle size controlled for high capacity, versatility, and physical strength. Applications include water demineralization and sugar refining.—*National Aluminate Corp., 6216 W. 66th Pl., Chicago 38.* (195G)

## INGREDIENTS

### L-Lysine Now Available For Fortification Use

L-lysine, an essential amino acid which cannot be synthesized by the body, is now commercially available for use as a dietary supplement. Potential applications include fortification of wheat foods and other cereal grains.

Product is a white crystalline powder (80 mesh) with a 98% potency. It is free of d-lysine, a form not usable by the body.—*Charles Pfizer & Co., 630 Flushing Ave., Brooklyn, N. Y.*

Circle 195H on Reader Service Card

### Imitation Flavor Offers True Apple Aroma

Wide application is cited for a new imitation apple flavor, based on a new approach to authentic reproduction of apple aroma, and without chemical by-taste.

Known as Imitation McIntosh, it is available in various concentrations in both liquid and powder form.—*Felton Chemical Co., 599 Johnson Ave., Brooklyn, N. Y.*

Circle 195I on Reader Service Card

## EQUIPMENT APPLICATIONS

### Plastic Belting Boosts Conveying Efficiency

Use of a special plastic food-handling conveyor belt has boosted efficiency in transferring beans and peas from dewatering reel to picking tables at Owen Canning Corp., Owen, Wis.

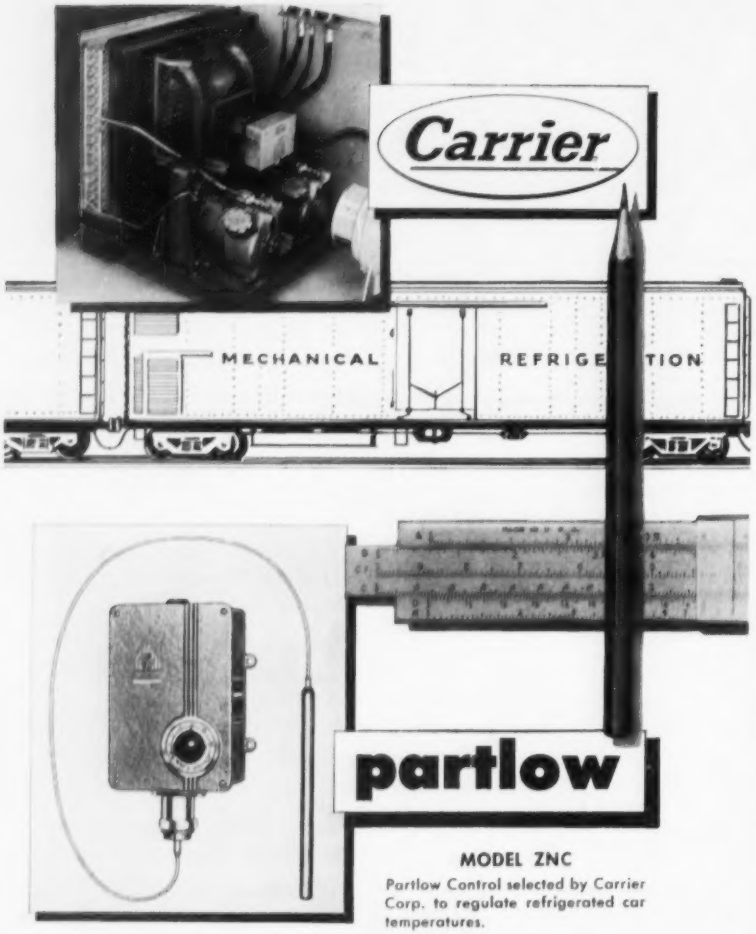
Specifically, the belt (Koroseal, B. F. Goodrich Industrial Products Co., Akron, Ohio) has cut spillage and cleaning problem in carrying up to 2 tons of vegetables per hr. Company-installed stainless clips prevent items from sliding down the belt. There is no mildew, although belt is subjected to water and vegetable juice.

The 3-ply unit, 23-ft. long and 16-in. wide, is powered by a ¼-hp. motor. It runs at a slope of 35 deg. at about 300 fpm., and lifts vegetables to a height of 6 ft. Belts are available in tan or white colors, and have high resistance to vegetable, animal, or mineral oils, greases, certain organic or inorganic acids, and alkaline or neutral salts.

Circle 195J on Reader Service Card

### Potent Defoamer Curbs Production Losses

An ounce a day of silicone defoamer has solved a triple problem at Ready Quick Food Co., Colonial




MODEL ZNC

Partlow Control selected by Carrier Corp. to regulate refrigerated car temperatures.

## Partlow Controls help Carrier Railway Refrigeration Units "think for themselves"

Carrier Railway Refrigeration Units that "think for themselves" are setting a new standard for positive, controlled temperature in rail transportation of frozen foods. *And Partlow Controls call the signals that keep temperatures on the button!*

The Carrier systems are designed to heat as well as cool, providing a constant temperature despite the various climate changes encountered in transcontinental runs. A car temperature range from –10°F to 70°F is possible, depending on the Partlow Control setting.

What's your temperature control problem? Tell it to Partlow! There's a Partlow Control to fit your requirements . . . in the range from –30°F to 1200°F. For use with gas, oil, steam or water valves; or electrical equipment.

SEND FOR CONDENSED CATALOG

**partlow**

**the pioneer in mercury thermal controls**

THE PARTLOW CORPORATION, Dept. F-157, New Hartford, N.Y.
Offices in All Principal Cities

NO MATTER WHAT YOU MAKE, PARTLOW CONTROLS WILL HELP MAKE IT BETTER



Heights, Va., processor of sliced potatoes for French frying.

To prevent color change, slices are given a sodium bisulphite wash. Formerly, foam in the tank carried out excessive liquid, which entailed a half-hour delay in restoring the liquid level. Also, foam-covered potatoes tended to adhere to a cloth conveyor belt used to take the slices out of the tank. Daily, from 200-300 lb. stuck beyond the drop-off point and subsequently fell to the floor.

Finally, foam packaged in bags of finished potatoes eventually liquefied, which detracted from consumer acceptance.

However, by adding 1 oz. of defoamer (AF Emulsion, Dow Corning Corp., Midland, Mich.) to the 150-gal. tank, product loss was reduced some 96%. Packaged product is now free of liquefied foam, and traces of silicone left on potatoes greatly reduce spatter in customers' cookers.

Circle 195K on Reader Service Card

### Air-Pressure Conveying Protects Milk Quality

During the past three years, Harrisburg Dairies, Inc., Harrisburg, Pa., has been using oil-free air from a single small compressor to transfer about 110 million lb. of milk products from storage tanks to filling equipment.

Furthermore, this unit (Ingersoll-Rand Co., Phillipsburg, N. J.) has required no maintenance during the nearly 1,100 consecutive days of operation.

The machine uses a non-lubricated cylinder and 1-hp. motor. Set up in an out-of-the-way corner, compressor moves milk, skim milk, and buttermilk to their destinations at 7 lb. pressure, without breaking up butterfat globules.

Air enters the tops of two 1,000-gal. storage tanks that are positioned just ahead of the filling equipment. Air pressure forces milk out of the tanks and through overhead pipes to three bottle-filling machines operating at 265 qt. per min. In addition, air from the same compressor pushes skim milk about 100 ft. from the storage vat into two 500-gal. tanks in the cottage-cheese department, and buttermilk from storage into a 500-gal. vacuum vat.

Circle 196A on Reader Service Card

# THE *RIGHT* CHES-LAMINATE TO *SOLVE YOUR* PACKAGING PROBLEMS!

## FOR CONVERTERS AND DIRECT USERS OF PACKAGING MATERIAL

**CHESLAM KB** ..... Polyethylene Coated Kraft Bleached

**CHESLAM KN** ..... Polyethylene Coated Kraft Natural

**CHESWRAP** ..... Polyethylene Coated Sulphites (Bleached)

**CHESROYALE POUCH** ..... Polyethylene Coated Pouch Paper (Bleached S.C.)

**CHESOPAQUE** ..... Polyethylene Coated Glassine Opaque

**CHESKLEER** ..... Polyethylene Coated Glassine (Super Transparent)

**CHESLAM VP** ..... Polyethylene Coated Vegetable Parchment

**CHESFOIL** Polyethylene Coated Foil Laminated to any of the Above Combinations

### All CHESLAM combinations possess these characteristics:

*Highly resistant to:*
- Water
- Moisture
- Vapor
- Extremely low M.V.T. rating

*Impermeable to:*
- Liquids
- Greases
- Oil
- Powaers

*Possess:*
- Dimensional stability
- Extremely long life
- Flexibility at low temperatures

*Also resists:*
- Acids
- Alkalis
- Puncture
- Splitting or cracking
- Rough handling

*Use for:*
- Pouches
- Bags
- Envelopes
- Tubes
- Rolls
- Sheets
- Strips
- Wrappers
- Bands

*Sealable by:*
- Heat
- Adhesives
- Pressure tapes
- Sewing

*Features:*
- Chemically inert
- Tasteless
- Odorless
- Non-toxic
- Extra tough
- Extra strong
- Printable

*Machinable:*
- Automatic
- Semi-automatic

## TECHNICAL ASSISTANCE

**Cheslam's completely equipped Testing Laboratory will aid you with your product packaging problem and make specific material recommendations.**

CHES-LAMINATES

**CHESLAM CORPORATION**

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FE-1-57

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City _____ State _____

Name _____ Title _____



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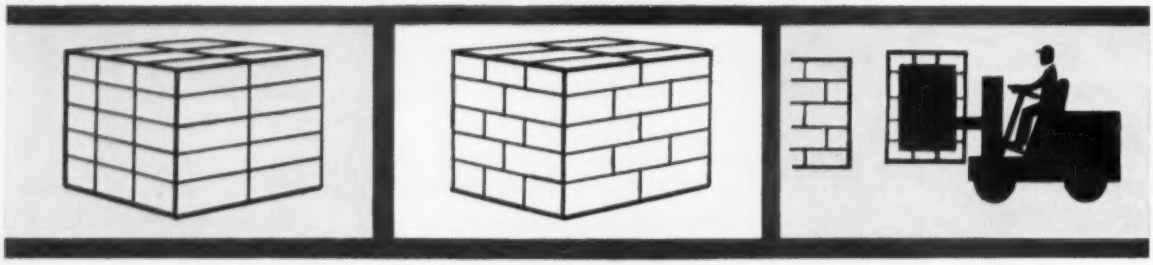
# NO PALLETS NEEDED

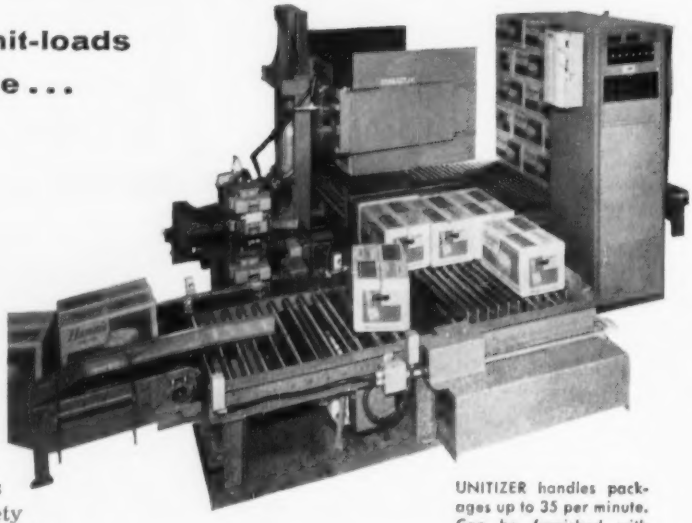
## to build and handle loads like these



# NEW *Standard* UNITIZER

**assembles and builds unit-loads in desired shape and size . . . automatically . . . directly from conveyor line!**

Here's a new machine offering all the advantages of conventional palletizers and pallet-load handling without the use of pallets. Unit-loads can be carried directly on the conveyor or picked up by clamp-type trucks. You save the cost of pallets . . . make more efficient use of available manpower. What's more, the UNITIZER handles a wide variety of package sizes . . . arranges them in interlocking or noninterlocking patterns.



UNITIZER handles packages up to 35 per minute. Can be furnished with selector switch or automatic sequence controls.

## *PLUS* advantages:

These operating and construction features make the UNITIZER outstanding for uninterrupted service and low maintenance:

- Control and actuation circuits are comprised of thoroughly proven hydraulic and electrical systems. Control panel switches allow any function of UNITIZER to be individually tested.
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**Ask Standard** how the UNITIZER can help you expedite production while cutting handling costs. Contact the Standard representative listed in your Classified phone book or write STANDARD CONVEYOR COMPANY, North St. Paul 9, Minn. Sales and Service in Principal Cities. Ask for Bulletin D-1.

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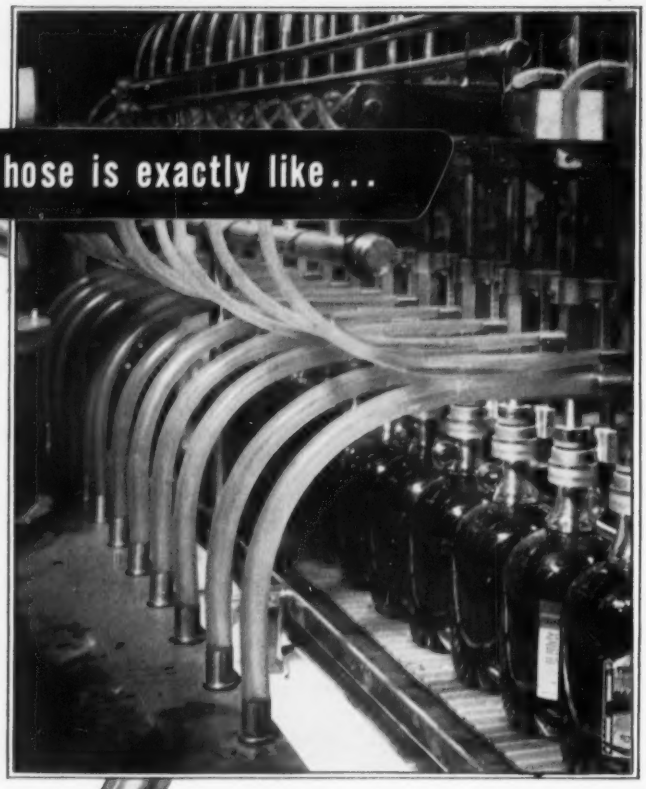

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## PLANT ENGINEERING

### Control Valves

Details sizes, specifications, pressure and temperature ratings, capacities, and optional accessories of various diaphragm control valves. *4p.—A. W. Cash Co., Decatur, Ill. (201A)*

### Automatic Boiler Valve

Outlines advantages, selection data, and prices for a series of feed, cut-off, make-up, pressure release, and float-operated valves for automatic boiler control. Each unit is pictured. *Bulletin C-63, 8p.—McDonnell & Miller, Inc., Chicago. (201B)*

### Midget Speed Reducers

Considers operation and applications for a series of tiny, gear-type speed reducers in the 1/40 to 1/10 hp. range. With over 600 fixed ratios to choose from, units are seen highly adaptable to small motor, control, chart, and servomechanism drives. *Bulletin 98, 4p.—Metron Instrument Co., Denver. (201C)*

### Snap-On Insulation

Describes snap-on pipe insulation for sub-zero to 350 F. applications. Specifications, installation instructions, and product listings are given. *File 37-B-2, 8p.—Gustin-Bacon Mfg. Co., New York City. (201D)*

### Six Pump Lines

Covers materials of construction, types, sizes, and capacities of six types of pumps. Also has photographs and drawings of units as well as performance range and power requirement chart. Included are centrifugal, corrosion-resistant, slurry, acid handling, diaphragm, heavy-duty, and piston units. *Bulletin 5000, 20p.—Dorr-Oliver, Inc., Stamford, Conn. (201E)*

### Prefabricated Piping

Gives complete information on the design, applications, and installation of prefabricated piping systems. Has photographs of installations, drawings of fittings, and step-by-step diagrams. Technical data includes flow tables, pressure drop curves, capacities, piping system data, and suggested piping specifications. *Catalog 100, 28p.—E. B. Kaiser Co., Glenview, Ill. (201F)*

### Speed Variator

Details action of a speed variator that controls output speed by rolling action of a series of balls. Operating data, dimensions, and drawings are included. *Bulletin K-200. 8p.—Cleveland Worm and Gear Co., Cleveland. (201G)*

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### Fractional HP Motors

Complete line of motors are described in detail. Tables give ratings and dimensions for the fractional hp. units. *Bulletin 1-1PL, 12p.—Century Electric Co., St. Louis. (201H)*

### Aluminum Stock

Has sizes and weights of rod, bar, sheet, coil, plate, and tubular aluminum products. Guide to selection, data on cutting facilities, finishes, and mechanical properties, also included. *16p.—J. T. Ryerson & Sons, Inc., Jersey City, N. J. (201I)*

### Proportioning Pumps

Contains photos, capacity charts, and dimension drawings with text of proportioning pumps suitable for use over a wide range of capacities and pressures. Compact units handle from 0.8 gph. to 900 gph. at discharge pressures up to 1,340 psig. *Bulletin 1140, 4p.—Proportioneers, Inc., Providence, R. I. (201J)*

### Air Filters

Treats of air filters using cloth and a filter aid to remove dirt,


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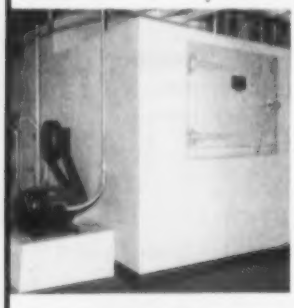

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smoke, and tar, from air. Specifications for units up to 60,410 cfm. are given. *Bulletin 557-B, 4p.—Wheelabrator Corp., Mishawaka, Ind. (201K)*

### Sanitary Pump

Illustrates construction of a sanitary liquid pump and gives a typical application, complete with drawings. *Bulletin 1056, 4p.—Milton Roy Co., Philadelphia. (202A)*

### Plastic Pipe

Describes chemical-resistant plastic pipe, fittings, and valves. Technical properties, chemical-resistance table, data on sizes, pressures, and dimensions, and prices are included. Instructions for threading, forming, and other installation operations are also given. *Bulletin CE-56, 8p.—American Hard Rubber Co., New York City. (202B)*

### Float Controls

Comprises bulletins on air conditioning and refrigeration float controls that list complete data for many valves. Applications are covered in text and drawings. Also has prices. *33p.—H. A. Phillips & Co., Chicago. (202C)*

### Hermetic Compressors

Contains specifications, dimensions, and data on components for a line of hermetic compressors. Designed for quiet, economical, operation, units are available in 2 to 7½ hp. sizes. *Bulletin C-1100-B93P, 4p.—Worthington Corp., Harrison, N. J. (202D)*

### Motor Line

Gives data for complete line of electric motors. Covers power, starting currents, full-load currents, torques, loads, and dimensions. *Bulletin B-2103-I, 12p.—Reliance Electric & Engineering Co., Cleveland. (202E)*

### Teflon Production Aids

Treats of Teflon material in the form of tape, sheets, rods, tubing and coating for glass fibers. Includes dimensions, properties, prices, and uses. *4p.—Chicago Gasket Co., Chicago. (202F)*

### Water Demineralizer

Provides design, performance, and cost data on electric membrane plants ranging in capacity from 2,500 to 2,000,000 gal. of dimineralized water daily. They handle input water containing from 1,000 to 10,000 ppm. of total dissolved solids. *Bulletin C, 17p.—Ionics, Inc., Cambridge, Mass. (202G)*

### Asbestos Insulation

Shows how asbestos pipe insulation is made, and where it can be used. Pictures and drawings of installation accompany technical data chart. Four tables cover prices, optimum insulation thicknesses, and heat savings. *40p.—Union Asbestos & Rubber Co., Bloomington, Ill. (202H)*

### Flexible Chain Couplings

Tables and drawings cover specifications, dimensions, ratings, and applications for silent, chain couplings. *Catalog C45-56, 16p.—Morse Chain Co., Ithaca, N. Y. (202I)*

### Motors and Reducers

Describes three styles of speed reduction: Integral gear motors, speed reducers with separate motors, and speed reducers alone. *Bulletin 191, 12p.—Sterling Electric Motors, Inc., Los Angeles. (202J)*

### Gear Motors

Explains construction and selection for a line of gear motors. Drawings show designs, and gives technical data in table form. *Bulletin GEA-6133A, 8p.—General Electric Co., Schenectady, N. Y. (202K)*

### Plastic Piping

Includes physical properties, chemical resistance tables, valve dimensions, and flow rate charts for a line of PVC piping. *16p.—Colonial Plastics Mfg. Co., Cleveland. (202L)*

### Steel Tubing Facts

Details technical data on alloy steel tubing, pipe, and welding fittings. Line includes different shapes, sizes, grades, fabrication. *Technical Data Card 146-A, 4p.—Babcock & Wilcox Co., Beaver Falls, Pa. (202M)*

### Packaged Boilers

Outline ratings and dimensions of automatic boilers up to 25 hp. Facts on both oil and gas-fired units are included. *Bulletin 1233, 4p.—Orr & Sembower, Inc., Reading, Pa. (202N)*

### Fuel Burners

Capacities and dimensions of gas and dual-fuel burners are tabled. Both lines feature part stainless construction, flame length control, observation port, and direct spark ignition. *Data sheets 808, 415A, 4.—Hauck Mfg. Co., Brooklyn. (202O)*

### Flexible Couplings

Pictures flexible couplings employing pre-loaded rubber disks as the flexible medium. Dimensions and specifications are given on standard, double, and radial-type couplings. Deflection charts and instructions explain how torsional vibration of the system is controlled. *Catalog C41-56, 24p.—Morse Chain Co., Ithaca, N. Y. (202P)*

### Rotary Gear Pump

Tables pumping data that includes rotary gear pump sizes, capacities and horsepowers, viscosity-temperature relationships, viscosity conversions, and engineering equivalents. Units range up to 145 gpm. with 13.4 hp. *14p.—Northern Pump Co., Minneapolis. (202Q)*

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**Foxboro Magnetic Flow Meter.** Accurately measures the flow of virtually any liquid except non-conductors like chocolate, fats and oils. Installs easily in the line like any equivalent length of pipe. No taps, seals, purges, meter runs, or straightening vanes required. Connects by 2-conductor cable to remote Dynalog Controller.

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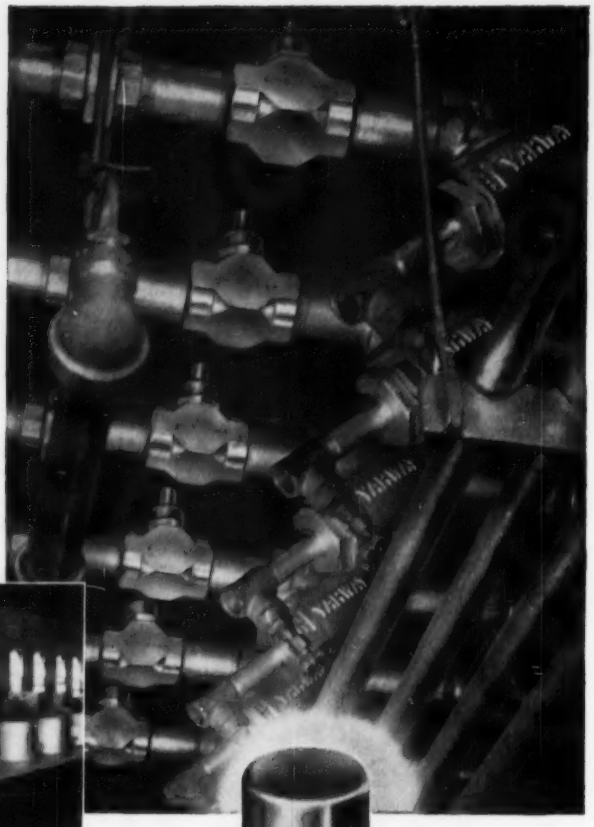
## cooks up more cranberry sauce profits with *Yarway Impulse Traps*



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## MATERIALS HANDLING

### Tractor Shovel

Contains full facts on working-efficiency, hydraulic system, and other operating details for a tractor shovel. Unit handles up to 1¼ cu. yd. with each scoop. *Form 311, 4p.—Frank G. Hough Co., Libertyville, Ill. (205A)*

### Overhead Conveyor

Presents brief details on construction and installation of a chain-type overhead track conveyor. Chain is completely enclosed in a tube for cleaner operation. *4p.—Chainveyor Corp., Los Angeles. (205B)*

### Small Fork Trucks

Treats of engineering aspects and operational features of a series of walking-type and small, riding-type industrial fork trucks. Chart lists available capacities, which range from 1,500 to 3,000 lb. *Bulletin 56W, 8p.—Moto-Truck Co., Cleveland. (205C)*

### Product Shelves

Covers installation and use of modular steel shelving in freezing areas for efficient stacking of cartoned products. *1p.—Union Steel Products Co., Albion, Mich. (205D)*

### Roller Conveyors

Particular attention is given to roller-bearing construction, and available sizes and shapes in this line of roller conveyors. Turns, switches, and other accessory equipment are also noted. Charts speed selection. *Catalog 60A, 20p.—E. W. Buschman Co., Cincinnati. (205E)*

### Fork Trucks

Gas or LPG-powered fork trucks are 37 in. wide and have capacities up to 2,000 lb. Job attachments include load-grab boom, and scoop. *Form 1504, 4p.—Hyster Co., Danville, Ill. (205F)*

### Flour Car Unloader

Describes one-man rail-car unloader for flour that delivers up to 1,000 lb. per min. *1p.—Crissey Co., Kansas City, Kans. (205G)*

### Lifts and Conveyors

Concerns hydraulic-lift hand trucks and roller conveyors. Drawings show dimensions and tables give capacities, which run to 6,000 lb. *Catalog HM-56, 4p.—American Pulley Co., Philadelphia. (205H)*

### Gravity Conveyor

Illustrates uses of gravity conveyor sections and attachments. Aluminum frames and wheels and steel shafts are incorporated, or all zinc-plated steel models can be had. *Bulletin 801, 8p.—Oliver Corp., York, Pa. (205I)*

### Electric Stand-up Truck

Gives complete breakdown views of all component parts in a new 2,000-lb., electric stand-up lift truck. Operational advantages are detailed. Special fork attachments are pictured and discussed. *Catalog 32-1, 20p.—Lewis-Shepard Products, Inc., Watertown, Mass. (205J)*

### Aluminum Hand Truck

Leaflet shows construction and dimensions of a lightweight, aluminum hand truck, available with glides for operation on stairs. *1p.—Nutting Truck & Caster Co., Fairbault, Minn. (205K)*

### Dry-Ice Shippers

Has specifications and prices for a line of dry-ice, chilled shipping containers for frozen foods. Units range from 100 to 3,000 lb. capacity. *2p.—Meese, Inc., Madison, Ind. (205L)*

### Product Bins

Informs on series of galvanized skid bins, available in collapsible and uncollapsible models. Units are primarily designed for meets, but are seen adaptable to a wide variety of products. *1p.—Union Steel Products Co., Albion, Mich. (205M)*

### Feeders and Handlers

Concerns a wide line of vibrators, vibrating feeders, and elevators for handling dry materials. *Catalog 564, 52p.—Syntron Co., Homer City, Pa. (205N)*

### Adjustable Loading Dock

Furnishes all facts on automatic operation of a spring-loaded dock plate that automatically adjusts to correct truck height. Also, it compensates for tilted truck beds. *Bulletin D-160, 4p.—Kelley Co., Inc., Milwaukee. (205O)*

### Automatic Handling

Shows applications of a line of automatic, handling-equipment. Monorail type units are shown that use many automatically-controlled devices. *Bulletin 115, 20p.—Louden Machy. Co., Fairfield, Iowa. (205P)*

### Truck Line Catalog

Bound together are catalogs for riding type electric fork trucks, "walkie" electric trucks, stackers and cranes, hand lift trucks and skid platforms, floor trucks, dragline trucks, and storage racks. Dividers separate differently colored sections. *128p.—Lewis-Shepard, Watertown, Mass. (205Q)*

### Electric Fork Trucks

Contains drawings and data for electric fork trucks of 6,000 lb. capacity. Low and high lifts are

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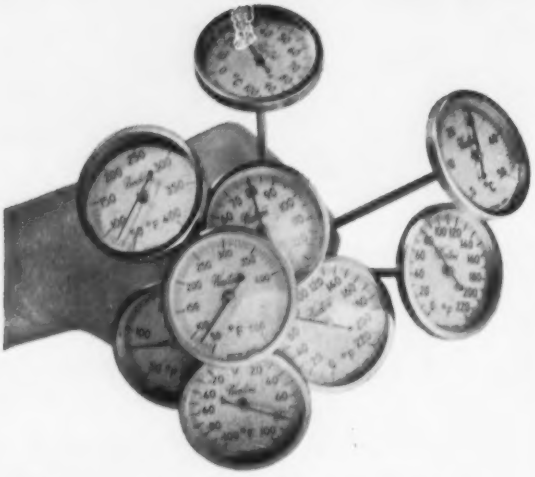

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**THERMOMETERS**

available for either truckloading or high tiering. *Bulletin F-31T6, 4p.—Elwell-Parker Electric Co., Cleveland. (205R)*

### Handling System

Full color manual has tabbed sections devoted to chains and attachments, monoveyer units, tracks, roller turns, traction wheels, take-ups, drive units, and safety devices, for mechanical handling systems.

Each of the sections has descriptive text, drawings, dimensions, specifications, and application photos. *Catalog M-4, 156p.—Request this catalog direct from Mechanical Handling Systems, Inc., 4600 Nancy Ave., Detroit 12, Mich.*

### Lift-Truck Line

Pictures in color the main components of a line of lift trucks. Important in these units are torque multipled service brakes, simple controls, unobstructed floor board, and extra wide seat. Easy maintenance is stressed. *Bulletin PC-92, 16p.—Clark Equipment Co., Battle Creek, Mich. (206B)*

### Pallet Unloader

Depicts sequence of motions for a pallet unloader that delivers packages single file at up to 30 per min. Unit is electronically controlled and is actuated with electric motors and hydraulic devices. *4p.—Alvey Conveyor Mfg. Co., St. Louis. (206C)*

### Automatic Dockboards

Covers specifications for a line of dockboards, 6 ft. wide and up to 10 ft. long. Drawings show all details of the 20,000-lb. capacity units. *Bulletins 160 and 181, 8p.—Kelley Co., Inc., Milwaukee. (206D)*

## INGREDIENTS

### Starches and Gums

Treats of a line of starches, dextrines, water-soluble gums, and adhesives. Applications are shown in color for a complete line of food. *20p.—Morningstar Nicol, Inc., New York City. (206E)*

### Irish Moss Extractives

Company publication has technical articles on gum carrageenin-type of Irish moss extractives and covers some of their applications. *Fall, '56. 4p.—Seaplant Chemical Corp., New Bedford, Mass. (206F)*

### Usefulness of Dextrose

Briefly details advantages of using dextrose for bakery products. Seven point list includes economy, moisture retention, and color stability as prime features. *4p.—Clinton Foods, Inc., Clinton, Iowa. (206G)*

### Orange Juice

Treats of chemical and nutritional properties of orange juice, and mentions applications including fruit punches, syrups, bake goods, and desserts. *4p.—Sunkist Growers, Ontario, Calif. (206H)*

### Organic Chemicals

Classifies and lists formulas and properties of more than 335 organic chemicals. Fugistatic products are included and condensed data on applications are presented. *Booklet F-6136. 24p.—Carbide & Carbon Chemicals Co., New York City. (206I)*

### Essential Oils

Lists wholesale prices of essential oils including terpeneless oils, citrus concentrates, floral absolutes, aromatic chemcials, fixitives, colors, and others. *12p.—Fritzsche Bros. Inc., N. Y. C. (206J)*

## PROCESSING

### Triple-Action Mixer

Stresses applications of triple-action ribbon-type horizontal mixer. Construction, installation, and operation are covered and data is tabled. *TSB 6-538, 8p.—Strong-Scott Mfg. Co., Minneapolis, Minn. (206K)*

### Heat Exchangers

Describes heat-exchange units consisting of two embossed metal sheets, spot-welded together to form channels for passage of heating or cooling media. Applications for units in many sizes and shapes are pictured. Lists specify dimensions and construction material. *Bulletin IP-356, 8p.—Tranter Manufacturing, Inc., Lansing, Mich. (206L)*

### Heat Exchanger

Seven-color diagram shows flow in plate-type heat exchanger. Designed for pasteurizing milk, the vacuum-steam system keeps steam temperature at a point only slightly above pasteurizing. *18p.—DeLaval Separator Co., Poughkeepsie, N. Y. (206M)*

### Material Feeder

Accurate feeding of two or more liquids or solids into continuous processes by gravimetric or volumetric means is detailed. Capacities, accuracies, ranges, types of materials handled, are listed. Representative installations are pictured. *Bulletin 10-N1, 4p.—Omega Machine Co., Providence, R. I. (206N)*

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*"People often are hoggish about paper towels"*

WITHOUT realizing it they'll use from two to four single fold towels just for drying.
— wasting up to 40 inches of towelling.
But you can control this waste.
*With savings up to 40%!*
How?
*By installing WESTROLL TOWELS in West Micromatic Cabinets.**

PEOPLE quickly unroll as little or as much as they want. But without realizing it they take less. Averaging 17 inches of soft, absorbent WESTROLL.
Saves janitors' time, too.
— one filling of the tamper-proof cabinet equals four of a single fold towel dispenser.
— there's less litter to clean up.
And washrooms are cleaner, neater.
**Cabinets are loaned.*

# "Westroll Towels cost us 30% less across the U.S.A."

"When you're concerned with a multi-plant operation such as ours, a small savings in an expendable item such as paper towels can mean many valuable dollars saved at the end of the year. We found, by using Westroll Towels in the Micromatic Cabinet, that our costs were reduced by 30% based on a closely supervised comparative test against interfold towels," says MR. R. E. RANDALL, Buyer for Libby, McNeill & Libby, Chicago.

"With these savings, it was only natural that we should shift a major portion of our plant facilities throughout the country over to this efficient and economical toweling. Our washrooms remain neater, too; and we realize additional savings in cabinet-filling time and janitor clean-up time."

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**S/K**apades in industry

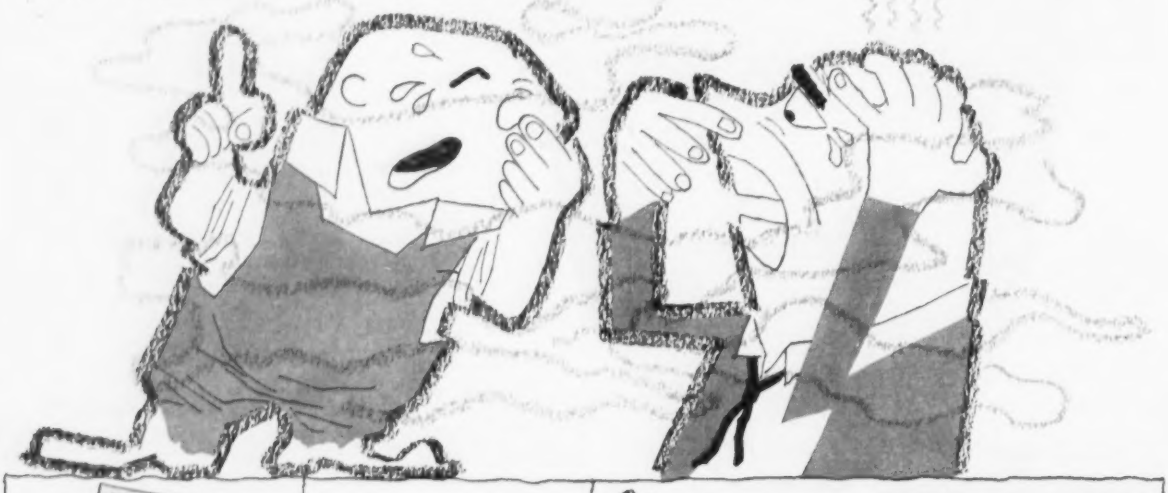
# HOW TWO ENGINEERS BEAT THE HEAT AND SOLVED AN ODOROUS PROBLEM

The locale—the plant of a manufacturer of soap and allied products. The pressing problem—a 110° F temperature combined with ammonia fumes, produced during the making of Theobromine, which made working conditions unbearable in a section of the plant.

"Let's (kof-kof) look at the bright side, boss," suggested Shorty, the assistant plant engineer. "After all (kof), it could be worse (kof) . . . I know a guy who works in a meat rendering plant and if you think this situation smells, you—"

"SMELLS—SCHMELLS," screeched Barney, plant engineer and boss. "I KNOW (squrk) WHAT I THINK (hack). I THINK IF THIS SITUATION ISN'T SOLVED SOON, YOU'LL—*rendering plant?* You said rendering plant. SAY, didn't I see something about how an SK Fume Scrubber solved a fume problem in a rendering—"

"Boss, you're right," called Shorty on his way to the office.



"HERE IT IS!" shouted Shorty, reading, "SK FUME SCRUBBER ELIMINATES OBNOXIOUS FUME PROBLEM. Say, let's get an SK engineer in here."

And, they did. In no time at all, an SK Sales Engineer arrived, made an on-the-spot survey of the situation, and recommended the immediate installation of an SK 36" Fume Scrubber.

AND A BONUS—Now, air cooling and fume removal are both accomplished by the Fume Scrubber. Hot air and fumes pass through the scrubber where the ammonia fumes are removed and the hot air cooled. The air then passes through a scrubber box (equipped with SK Spray Nozzles), is further cooled, passes through heaters which raise its temperature to 70° F and reduce humidity to 70%, and returns clean and cool, to the building. The only operating cost is that for power to pump the pressure water which comes from a nearby quarry and well.

**MORAL:** *Chemical processing, food, or petroleum refining—no matter what business you're in—get acquainted with SK Fume Scrubbers. Send for Bulletin 4-R. Make use of a jet apparatus specialist, your nearest SK Sales Engineer.*

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GEAR PUMPS: Ask for Bulletin 17-A.

## QUALITY CONTROL

### Fluorescent Cabinet

Covers fluorescent analysis cabinet for indentification of products under ultra-violet light. White light light is also available for comparison. 2p.—*Ultra-Violet Products, Inc., San Gabriel, Calif. (209A)*

### Stirrers and Shakers

Catalogs line of stirrers, mixers, and shakers. Included are electrical, air, and magnetic units. *Bulletin FS-264, 16p.—Fischer Scientific, New York City. (209B)*

### Dairy Culture Kit

Attractive folder houses dairy culture kit that includes bulletins on bacteriophage and antibiotic detection, use of cultures, curd tests, and slow-acid milk tests. *34p.—Marschall Dairy Laboratories, Inc., Madison, Wis. (209C)*

### Lab Furniture

Pictures benches, drawers, cabinets, and also covers instruments, tank mixers, freeze driers, Teflon glands, and other equipment for lab use. *12p.—Arthur S. LaPine & Co., Chicago. (209D)*

### Polyethylene Lab-Ware

Relates facts on polyethylene plastic, and prices and pictures standard items, such as bottles, beakers, funnels tubing, test tubes, valves, cylinders, and pails. *Bulletin P-965, 16p.—Scientific Glass Apparatus Co. Inc., Bloomfield, N. J. (209E)*

### New Lab Catalog

Features balances, ovens, step ladders, jar mills, stirrers, pumps, and other lab aids. Has revised price list. *Supplement 956, 62p.—Schaar & Co., Chicago. (209F)*

## INSTRUMENTS

### Humidity Instruments

Index includes hygroscopic, electronic, and wet and dry bulb humidity instruments, controllers, accessories, and typical installations. Wet and dry bulb conversion tables, psychrometric charts, and instrument mounting dimensions are tabled. *Bulletin H1009, 22p.—Bristol Co., Waterbury, Conn. (209G)*

### Turbidity Controller

Concerns an instrument that continuously records and controls turbidity of fluids. It is based on a dual-beam system whereby light scattered by suspended particles is compared with light transmitted by the fluid. 2p.—*Kaye Development Co., Cambridge, Mass. (209H)*

### Detection Instruments

Treats of units for detecting and recording changes in temperature, pH, and other variables. Loggers, scanners, and complete process control systems are also pictured and rated. *12p.—Leeds & Northrup Co., Philadelphia. (209I)*

### Compact Controls

Specifies construction and advantages of a packaged control system, whereby recorder and controller are concentrated in a single, panel-mounted chassis. Plug-in connections offer flexibility. *Bulletin A-800, 4p.—Swartwout Co., Cleveland. (209J)*

### Centralized Controllers

Considers engineering features of a thermistor-actuated temperature controller for either single- or multi-point control. Additional control units are merely plugged into a single power supply chassis for centralized temperature regulation. *Bulletin MC-133, 4p.—Fenwal, Inc., Ashland, Mass. (209K)*

### Thermocouple Wires

Specifies plastic-insulated thermocouple extension wire, available in 14-, 16-, and 20-gage sizes, for use with all types of thermocouples. *Specification Sheet S00-21, 2p.—Minneapolis-Honeywell Regulator Co., Philadelphia. (209L)*

## SANITATION

### Cleaning Compounds

Chart lists a wide variety of cleaning operations in the food industry and details compounds, concentrations, temperatures and general use directions for speeding them.—*Philadelphia Quartz Co., Philadelphia. (209M)*

### Dairy Cleaning Program

Bulletin treats of equipment, methods, and compounds that result in an efficient sanitation program for dairy operators. Procedures covered include in-place cleaning, milk can conditioning, bottle washing, and tank, vat, and equipment sanitation. — *Oakite Products, Inc., New York City (209N)*

### Electric Sweeper

Pictures uses of an electric power-sweeper that can work an 8-hr. shift without recharging. Has built-in battery charger, three-speed transmission, and increased hopper capacity. 8p.—Wayne

Tread-sure, an abrasive-filled plastic brushcoating, produces an antiskid surface on wood, concrete or steel. Resists gasoline, alcohol, oil, grease and many types of acids. Provides nonslip safety footing on walkways or stairs whether the surface is wet, dry or oily, either indoors or outdoors. Available in Battleship Gray, Red, Green and Yellow. For full information, write: Dept. H 15-196

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*Manufacturing Co., Pomona, Calif. (209O)*

### Polishers and Scrubbers

Describes line of floor polishing and scrubbing machines. Photos and table of specifications for each unit are included. *17p.—Finnell Systems, Inc., Elkhart, Ind. (210A)*

### Bakery Cleaning

Discusses up-to-date recommended cleaning procedures for the baking industry. Solutions to the problems of cleaning various types of baking pans, scale and algae control in air conditioners, deodorizing, bacteria destruction, control of mold, and cleaning and sanitizing of machinery are furnished. *Form 4585R5, 28p.—Oakite Products, Inc., New York City. (210B)*

### Washer and Sterilizer

Pictures washer and sterilizer for pan and can molds. Standard units wash up to 600 pans per hour. *4p.—Niagara Bottle Washer Manufacturing Co., Toledo, Ohio. (210C)*

### Bottle Cleaner

Describes units that air-clean bottles and feed them directly to the filler. Units have quick change-over, accurate sychronization, and only one operator for two operations. *2p.— Machinery Service Co., Louisville, Ky. (210D)*

### Chlorine Feeder

Diagrams semi-automatic, step program, and automatic proportional control for a chlorine gas feeder. Illustrated are the visible flow indicator, visible vacuum pyrex bell jar, and positive-control chlorine diaphragm valve. *Bulletin 840-N10, 4p.—Builders-Providence, Inc., Providence, R. I. (210E)*

### Water Sterilizer

Furnishes data on an ultraviolet water sterilizer line, with capacities up to 7,000-gph., that gives a 99% reduction in bacteria. Photos show action on bacteria and applications in food industry. *4p.—Aquafine Corp., Los Angeles. (210F)*

### Mechanized Sweeping

Reviews advantages and discusses aisle width, dust control, and possible cost savings of mechanized sweeping. Includes a check list to predetermine a sweeper's usefulness, and its value for sanitation. *8p.—G. H. Tennant Co., Minneapolis. (210G)*

### Dust Binder

Covers features of a dust-binder that can be mixed with water and sprayed to control dust conditions. Consists of approximately 60% semi-liquid petroleum and 40% detergent solution. *8p.—Golden Bear Oil Co., Oildale, Calif. (210H)*


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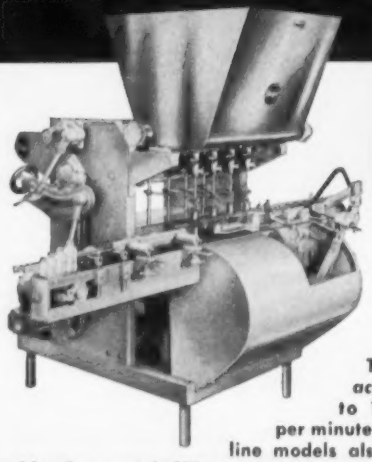

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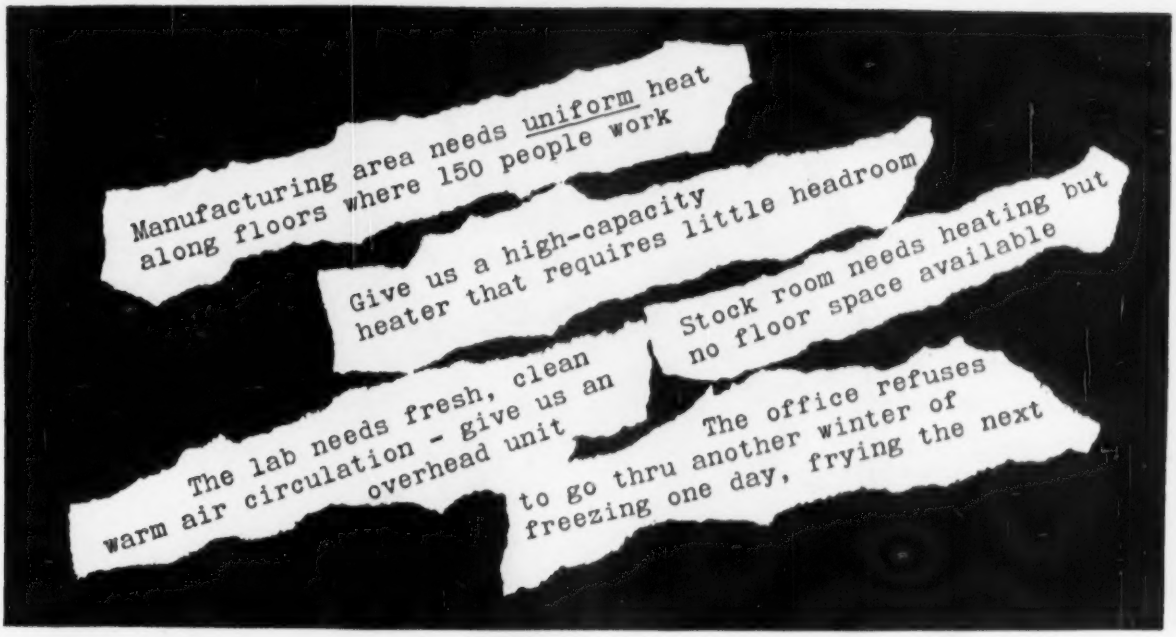
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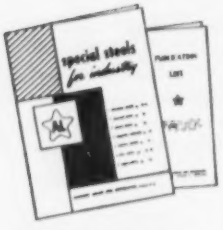


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## Guide to Process $$$

CHEMICAL PROCESS ECONOMICS IN PRACTICE *By J. James Hur. Published by Reinhold Publishing Corp., 430 Park Ave., New York City 22. 1956. 115 pages, 5 x 7¼ in., cloth. Price:* $3.95.

Reporting the proceedings of the fourth "Experience in Industry" Symposium of the American Institute of Chemical Engineers and the University of Pennsylvania's School of Chemical Engineering, this handy little book presents the views of nine recognized experts in the economics of chemical processes.

The book stresses the practical rather than the theoretical, using the terminology and methods of the accountant and economist as they are actually used in the industry.

## Chemical Spending

CHEMICAL ENGINEERING COST ESTIMATION *By Robert Aries and Robert D. Newton. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York City 36. 1955. 263 pages. 6¼ x 9¼ in., cloth. Price:* $6.00.

The latest in a series on chemical engineering, this work is of particular importance to chemists, chemical engineers, and those members of management concerned with estimating costs of new units and manufacturing costs.

Purposes of the book are to outline principles of cost estimation and evaluation, and to offer quantitative data for application of methods discussed to solving practical industrial problems.

Comprehensive and complete, the book will serve to bridge the gap between technology and economics.

## Up-to-Date Chemistry

ORGANIC CHEMISTRY (*Third Edition*) *by Louis F. Fieser and Mary Fieser. Published by Reinholds Publishing Corp., 430 Park Ave., New York City 22. 1956. 1112 pages. 6¼x9½ in., cloth. Price:* $10.

Revised to keep all information abreast of technological advances and research, this standard reference work now includes detailed and authoritative information on the principles and concepts of modern organic chemistry.

It covers such topics and structures and total synthesis of important fatty acids, carbohydrates, peptides, enzymes, alkaloids, and antibiotics. Developments in the protein fields have been incorporated in appropriate chapters. The chapter on metabolism of fats, carbohydrates, and proteins has been completely revised to include data resulting from the use of tracers and microbiological techniques.

Indexed and illustrated, the book is a welcome addition to the technologists reference shelf.

## Booklets & Reports

FROM WHEAT TO FLOUR *Published by Wheat Flour Institute, Chicago 6. 36 pages. Price:* $.25. Illustrated reference on history of wheat from wild grass seed to modern flour mill.

APPRAISING AND INTEGRATING EMPLOYEE BENEFITS *Published by Robert Industrial Relations Section, California Institute of Technology, Pasadena, Calif., 24 pages. Price:* $1. Evaluation and integration of program of employee benefits.

SUCCESSFUL MEAT SMOKING *Published by Koch Suppliers, Kansas City 8, Mo. 18 pages, paper. Price:* 25¢. Guide for smoke house operators.


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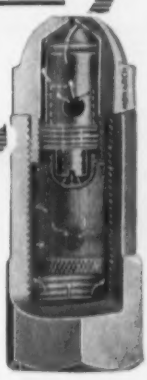

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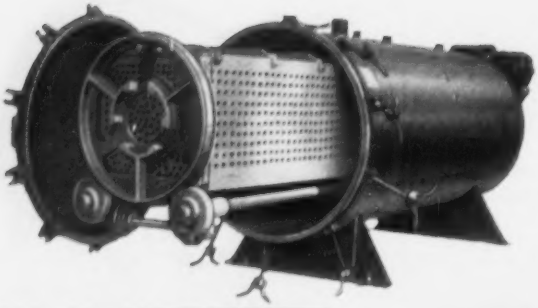

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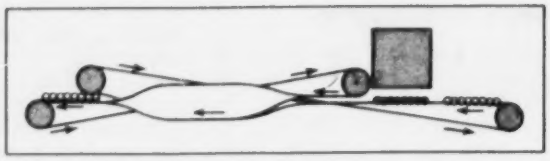


**Packing Unit Employs Inverting Conveyor**

Unit packs fruit-like items in containers having individual recesses. Conveyor has pockets corresponding to package recesses. Container is inverted over fruit, then conveyor reverses, which rights container with fruit positioned in recesses.—C. F. Stewart to Clifton-Grant Development Corp., Warren, Ohio. No. 2,763,110. Sept. 18, 1956.

## PRODUCTS

**Rice Paddy** Made by Surface Drying Grain, Gelatinizing, Rapidly Cooling, Dehydrating—A. K. Ozai-Durrani, Stuttgart, Ark. No. 2,758,031. Aug. 7, 1956.

**Dairy Products** Processed With Glycerol and Acid or Alkaline Substances—J. P. Jensen, Copenhagen, Denmark. No. 2,758,925. Aug. 14, 1956.

**Foam-Producing Beverage** Having Carboxymethyl Ether of Dextran—H. A. Toulmin, Jr., to Commonwealth Engineering Co. of Dayton, Ohio. No. 2,758,926. Aug. 14, 1956.

**Soluble Coffee** Prepared by Grinding Unroasted Beans in Aqueous Hot Extracting Medium, Separating, Spray-Drying, Roasting—F. A. Chase, Morris Plains, N. J., to American Home Products Corp., New York City. No. 2,758,927. Aug. 14, 1956.

**Baking Grease** Comprising Vegetable Oil With Acidity Below 2.6%, Color Below 12 Gardner, Viscosity 1.3-2.0 Stokes at 77 F.—F. F. Hansen, Pittsburgh. No. 2,758,928. Aug. 14, 1956.

**Antioxidant** Consisting of Fatty Monoglyceride Citrate, Propyl Gallate, Glycerin—L. A. Hall to Griffith Laboratories, Inc., Chicago. No. 2,758,931. Aug. 14, 1956.

**Dried Egg Whites** Having Improved Whipping and Baking Properties Made by Adding Water-Soluble Alaphatic Polyhydric Alcohol or Sucrose to Liquid Whites, Drying—B. M. Shaffer to B. L. Sarett, Chicago. Nos. 2,758,933-935. Aug. 14, 1956.

**Dates Canned With Water** by Sealing Under Vacuum, Heating—R. P. Ferren, Los Angeles, to American Can Co., New York City. No. 2,760,872. Aug. 28, 1956.

**Nut Kernels** Made Friable by Subjecting to Gas Pressure, Gradually Releasing Pressure—D. R. Bailey, Sacramento, Calif. No. 2,761,781. Sept. 4, 1956.

**Want more information on any of these recent patents—if so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.**

**Lard** Comprising Triglycerides Rearranged by Heating Liquid With Metal Alcoholate, Natural Lard—R. J. Vander Wal, Chicago, L. A. Van Akkeren, Oak Park, and R. J. Buswell, LaGrange, Ill. to Swift & Co. No. 2,763,556. Sept. 18, 1956.

## PACKAGING

**Bottle Capper** Comprising Cup-Shaped Die, Cap-Engaging Plunger, Actuating Means—C. Breer, Grosse Pointe, Mich. No. 2,761,265. Sept. 4, 1956.

**Aseptic Packaging** by Filling Sterilized Container Having Pierceable Diaphragm—E. B. Fairchild, Palo Alto, Calif., to B. G. Williams, San Mateo, Calif. No. 2,761,603. Sept. 4, 1956.

**Evacuating, Gassing and Sealing** Containers in Timed Cycles—A. C. Brant, Little Valley, N. Y., to the Borden Co. No. 2,761,604. Sept. 4, 1956.

Ninety million fish a year pass over this Wissco Belt. This belt, costing 30% *less* than those previously used by North Atlantic, has already lasted over 16 times longer.

# WISSCO BELTS *and the*
## *North Atlantic Fish Company*

*The story of Wissco Belts is best told by their users.* For instance, President Frank Cefalo of North Atlantic Fish Company, Gloucester, Mass., reports:

**"By switching to a Wissco Belt in 1948, we eliminated semi-annual belt replacements . . . increased our production flow by 100% . . . reduced our labor force by 8 men . . . and effected, *in addition*, a direct, immediate cost saving of at least $15,000 annually."**

And he goes further. "Not only is the Wissco Belt more durable than any other belt we've ever used, but it performs its function with greater efficiency. Since ours is a volume production operation, we're able to get our products to the market faster—a factor that has improved our overall profit situation."

North Atlantic uses their Wissco Galvanized Balanced Spiral Belt to convey fresh fish from the dock up a 30% incline to a weighing station. As the fish move along the belt, workers remove ice left on the fish when they leave the trawlers. "With the belts we previously used, the fish continually slipped back down the belt," Mr. Cefalo continues. "So we had to use sixteen men on this station—most of whom were engaged in a constant, irritating and expensive battle to keep the fish on the belt. Now, the wire mesh surface of our Wissco Belt has eliminated this problem, allowing us to reduce the men on this station to eight.

"In addition, our Wissco Belt does not loosen, crack or part at the seams when exposed to moisture from the fish and ice chips. These failures occured on an average of once a week with the belts we formerly used. The resultant work stoppages immobilized 150 workers throughout the entire plant for at least an hour and a half each time. Elimination of these stoppages, through installation of a Wissco Belt, saved us $300 a week in direct costs, plus a gain in our overall production figures."

If you have a processing or conveying operation, chances are that Wissco Belts can help you as they have helped the North Atlantic Fish Company. It will pay you to get the complete story today from our nearest sales office.

CF&I **WISSCO BELTS**

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION—Denver and Oakland
WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago
Detroit • New Orleans • New York • Philadelphia
CF&I OFFICES IN CANADA—Toronto • Montreal

4536

# "That new Taylor Instrument's saving us money already!"

No. 200TD111

## He's talking about the new Taylor low-cost Flow Transmitter!

THE reason he can spot the savings so quickly is that the No. 200TD111 Fixed Range Differential Pressure Transmitter is being used to measure departmental consumption of steam, air and water that previously went unchecked. That 3-pen recorder in the background shows at a glance how much is being used by a given department as a basis for apportioning costs. It's the remarkably low price of this new instrument that makes it such a practical cost accounting aid on applications hitherto considered marginal.

Measuring only 6½" x 3" and weighing only 4½ lbs., its simplified piping, force-balance construction and external adjustments make it easy to install and maintain. Calibration accuracy is better than 1%. Sensitivity exceeds 0.1%. Ranges 0 to 50, 100, 200 and 300 inches of water. Built for rough service and outdoor mounting.

Call your Taylor Field Engineer, or write for **Bulletin 98274.** Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.

**DESIGN SPECIFICATIONS**

Diaphragm of Neoprene-impregnated Nylon.
Body material, brass.
Maximum working pressure: 150 psi.; temperature 150°F.
Air Supply pressure, 20 psi.
Air consumption, 0.10 standard cu. ft. per minute.
Output pressure range 3 to 15 psi.
Size 6½" x 3". Weight 4 lbs. 9 ozs.
All connections ¼" internal NPT.

*Taylor Instruments*
*MEAN*
*ACCURACY FIRST*
IN HOME AND INDUSTRY

**Frozen Food Package** Consisting of Closed Cups in Open-Ended Carton—F. B. Steeger, Richmond, Va. No. 2,761,785. Sept. 4, 1956.

**Bag Sealer** Comprising Tape Receiver, Supporting Ledge, Slot, Pressure Means—R. W. Young, Jr., Harlingen, Tex. to Tri-Pak Machy. Service, Inc. No. 2,762,179. Sept. 11, 1956.

**Carton Erector** Employing Suction Head to Unfold Cartons—C. E. Kerr, Hoopeston, Ill., to Food Machinery & Chemical Corp., San Jose, Calif. No. 2,762,274. Sept. 11, 1956.

**Filling System** for Carbonated Liquids Comprising Storage Tank, Filler Having Reservoir for Liquid and Gas—R. H. Breeback, Baltimore, to Crown Cork & Seal Co., Inc. No. 2,762,545. Sept. 11, 1956.

**Sealing Containers** by Passing Through Zones of Increasing Concentration of Inert Gas, Applying Gas Directly, Applying Caps—C. L. Day, R. C. Albrecht, and F. E. Fauth to Crown Cork & Seal Co., Inc. No. 2,763,107. Sept. 18, 1956.

**Counting** and Packaging Machine Having Rotors, Hopper, Spacing and Counting Means—B. R. Garrett, Bayside, N. Y. No. 2,763,108. Sept. 18, 1956.

**Bagger** With Mobile Frame, Receptacle, Scale, Bag-Securing Means, Draw-String Closer—D. B. Baker, Kennewick, Wash. No. 2,763,109. Sept. 18, 1956.

**Can-Arranger** Comprising Discharge Belt, Conveyor, Deflectors, Dividers, Feed Means—A. S. Rose, San Jose, Calif. No. 2,763,359. Sept. 18, 1956.

**Dispenser** for Semi-Solids Comprising Container, Caps, Cover Having Opening—R. E. Shvetz, New York City. No. 2,763,405. Sept. 18, 1956.

**Container** for Pourable Foods Providing Closable Dispensing Opening—A. F. Stagmire to General Foods Corp., New York City. No. 2,763,409. Sept. 18, 1956.

**Blank** for Moisture-Proof Paper Container Having Main Ply With Side and End Panel Areas Connected by a Score Line, With Tabs, Inner-Ply Having Pouring Notch, Pouring Lip—C. R. Alden, Ex-Cell-O Corp., Detroit, Mich. No. 2,763,424. Sept. 18, 1956.

**Bagging-Unit** Having Conveyor, Packer, Scale Platform, Dribbler, Trip-Lever—H. V. Kindseth to Bemis Bro. Bag Co., Minneapolis. No. 2,763,458. Sept. 18, 1956.

## PROCESSES

**Vacuum System** for Aerating and Agitating Milk—W. R. Root, Keymar, Md. No. 2,760,765. Aug. 28, 1956.

**Treating** Potato Slices to Prevent Carmelization During Deep-Fat Frying by Passing Through Water at 150-160F.—M. A. Janis, Maumee, and E. G. Bremforder, to Kuehmann Foods, Inc., Toledo, Ohio. No. 2,762,709. Sept. 11, 1956.

**Stabilizing** Carbonated Malt Beverage by Adding Soluble Calcium Salt, Filtering Precipitated Calcium Oxalate—N. W. Brenner, Hartsdale, N. Y. to Schwarz Laboratories, Inc. No. 2,763,554. Sept. 18, 1956.

**Treating** Lard to Improve Looks and Keeping by Heating to 120-260 C. for ¼-6 hr. in Vacuum with Interesterification Catalyst—F. A. Norris and K. F. Mattil, Chicago to Swift & Co. No. 2,763,555. Sept. 18, 1956.

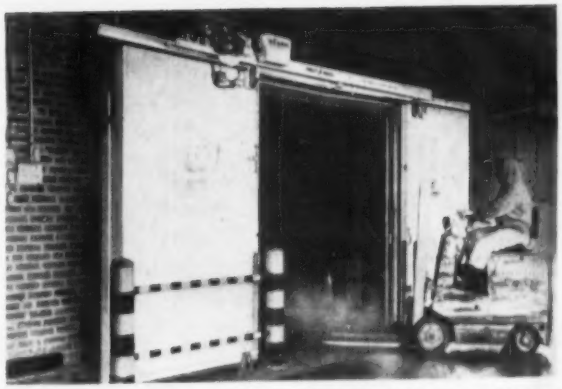
**Block-Freezing** by Placing Food in Alginate and Calcium Salt Solution, Freezing—O. Helgerud, Nordstrandshogda and A. Olsen, Fagertun pr. Drammen to A/S Protan, Drammen, Norway. No. 2,763,557. Sept. 18, 1956.

**Manufacturing** Food by Growing Amylase-Producing Yeast in Amylaceous Material, Maintaining Aeration and Agitation, Recovering Insolubles—L. J. Wickerham and C. C. Kuhner, Peoria, Ill. to USA. No. 2,764,487. Sept. 25, 1956.

## EQUIPMENT

**Shrimp Peeling** and Deveining Machine Comprising Endless Conveyor, Guide—N. Miller, New York City. No. 2,760,225. Aug. 28, 1956.

**Wax Coater** for Pickles Employing Conveyor Moving Through Molten Wax—H. Weinberg, Evanston, Ill., to Manhattan Pickle Co., Inc., Chicago. No. 2,760,462. Aug. 28, 1956.

LET PRESTO-O-MATIC® ELECTRIC COLD STORAGE DOORS SAVE YOU TIME AND REFRIGERATION

*Here's what they can do for you!*

You can reduce "open-door-time" as much as 75% with a Prest-O-Matic Electric Cold Storage Door, saving both time and refrigeration. Trucks move in and out automatically, without need for driver to leave his truck. Average time from open to close is 8 to 10 seconds. Cold stays in . . . heat stays out.

Clark Prest-O-Matic Doors come to you as a complete packaged assembly—doors, electric operator, frame, all hardware and controls. Installation is easily and quickly accomplished by the *simple process of attachment* to your wall. And each Prest-O-Matic includes the famous Clark Safety Edge, manual release for hand operation in the event of power failure, and thermostatically controlled heating cables for freezers.

*Consult your architect or write for complete information*

FINE DOORS SINCE 1878

CLARK DOOR CO.

505 Hunterdon St., Newark 8, N. J.

Shuttleworth **Can Handling Equipment**

**MAKES BIG LABOR SAVINGS**

Unscrambler

**Unscrambler**

The Shuttleworth Can Unscrambler, receiving cans from crate unloader or conveyor, delivers a steady feed to the labeler at great savings in labor. Requires no operator, handles cans gently and efficiently without denting. May be moved easily to labeler for delivery of bright cans.

Crate Unloader

**Crate Unloader**

For fast handling of wet or dry cans from the retort. Receives crates from dollies, monorail, or conveyor. No latching or fastening. Unloads and elevates to Unscrambler gently, without denting cans. Saves thousands of man hours per year.

**See this equipment at 1957 Canners Show—Booth 120—Conrad Hilton, Feb. 16-20.**

SHUTTLEWORTH MACHINERY CORP.
WARREN, INDIANA

Spice
Use
GAINING!
Statistics now prove Americans are more seasoning conscious than *ever before* in history.
All the more reason *to be sure* you're using high quality, NATURAL SPICES in all your products.
American Spice Trade Association
82 WALL STREET, NEW YORK 5, N. Y.


**Automatic Feed** for Ice Cream Freezers Comprising Pressure-Responsive Device on Discharge End of Cylinder—H. F. Oltz, Miami, Fla., to Ar-Tik Systems. No. 2,760,344. Aug. 28, 1956.

**Continuous Can Sterilizer** Comprising Feed Mechanism, Steam Zone, Head of Water to Balance Steam Pressure—E. Munz, Bottighofen, Thurgau, Switzerland. No. 2,760,873. Aug. 28, 1956.

**Smokehouse** Having Curing Chamber, Product-Support Means, Flue, Lower Housing—H. Sandler, Philadelphia. No. 2,761,374. Sept. 4, 1956.

**Bottle Washer** for Removing Labels, Separating Them From Wash Liquid—O. Schroeder, Napa, Calif. No. 2,761,799. Sept. 4, 1956.

**Coffee Roasting** and Quenching Unit Comprising Roasting Chamber, Air Heater, Condenser—W. H. Crutcher, Jr., Louisville, Ky., to Coffee Research, Inc. No. 2,762,289. Sept. 11, 1956.

**Filler Plate** for Bacon-Forming Press Employing Rounded Outer Surface to Prevent Wrinkling of Belly—J. R. Dunnegan, Ft. Worth, Tex., to Armour Co., Chicago. No. 2,762,296. Sept. 11, 1956.

**Baking Oven** With Horizontal Upper, Lower Partitions, Indirect Heating—J. V. Cook, York, Pa., to Read Standard Corp. No. 2,762,321. Sept 11, 1956.

**Nut-Cracking Machine** Having Rotary Wheels, Adjusting Means—M. Stahl, Brooklyn, N. Y. No. 2,762,410. Sept. 11, 1956.

**Conveying System** Consisting of Inlet and Outlet Conveyors, Variable-Speed Drive, Article-Transfer Means—H. E. Temple, San Gabriel, Calif., to Read Standard Corp. No. 2,762,487. Sept. 11, 1956.

**Nut Separator** Comprising Perforated Endless Belt, Agitating Means, Conveyor Below Belt, Vacuum Hood, Hopper—F. F. Fine, Durham, Calif. No. 2,762,506. Sept. 11, 1956.

**Tamale Unit** for Filling Into Tubes Closed at One End—J. A. Maickel, to J. Truzzolino, Butte, Mont. No. 2,764,106. Sept. 25, 1956.

PUMP
Liquids • Gases • Slurries
WITHOUT CORROSION OR CONTAMINATION
Wavelike Motion of
Steel Fingers Forces Material Through Tubing
Prices range from $55 to $500
depending on size of pump and accessory equipment required.
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To improve product quality and lower spraying costs, Spraying Systems offers the advantages of advanced design and better performance. Typical applications include mixing, washing, cooling and spray drying. We also offer spray nozzles to meet unusual conditions such as high abrasion or extremely fine atomization.
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ADVANCED SPRAY NOZZLE DESIGN FOR NEW DIMENSIONS IN CONTROL AND PERFORMANCE

# Inside Story on POWELL CORROSION RESISTANT VALVES

Corrosion resistant valves may appear to be alike on the outside. But inside — in trim materials, in design, in manufacture — there can be a world of difference. And the inside story of Powell Corrosion Resistant Valves is that every valve has PERFORMANCE VERIFIED.

The reason there's a big difference in Powell Corrosion Resistant Valves is quality control. It begins not with manufacture — but with the very materials which go into Powell Valves. As a final step of Powell's rigidly enforced quality control, every Powell Valve is subjected to an actual line test.

Powell has designed many new types of Corrosion Resistant Valves to meet the needs of the rapidly expanding chemical and process industries. The variety of pure metals and special alloys in which they are available has grown to such an extent that today there is a Powell Corrosion Resistant Valve to control the flow of almost every known corrosive fluid.

Consult your Powell Valve distributor. If none is near you, we'll be pleased to tell you about our COMPLETE quality line which has PERFORMANCE VERIFIED.

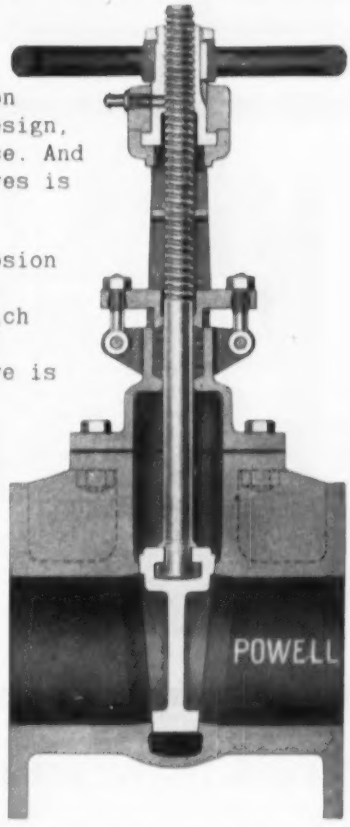
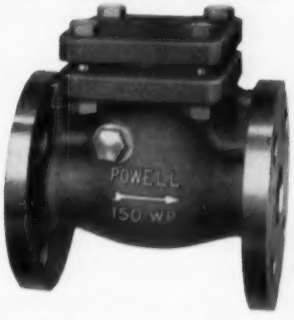



Fig. 2453-SG — Stainless Steel O. S. & Y. Gate Valve for 150 Pounds W. P.

Fig. 1314-A — 1500 Pound Integral Bonnet Alloy Steel "Y" Valve.

Fig. 2342 — Alloy Steel Bolted Cap Swing Check Valve for 150 Pounds W. P.




PERFORMANCE PV VERIFIED

**The Wm. Powell Company, Cincinnati 22, Ohio . . . 111th YEAR**

# POWELL VALVES

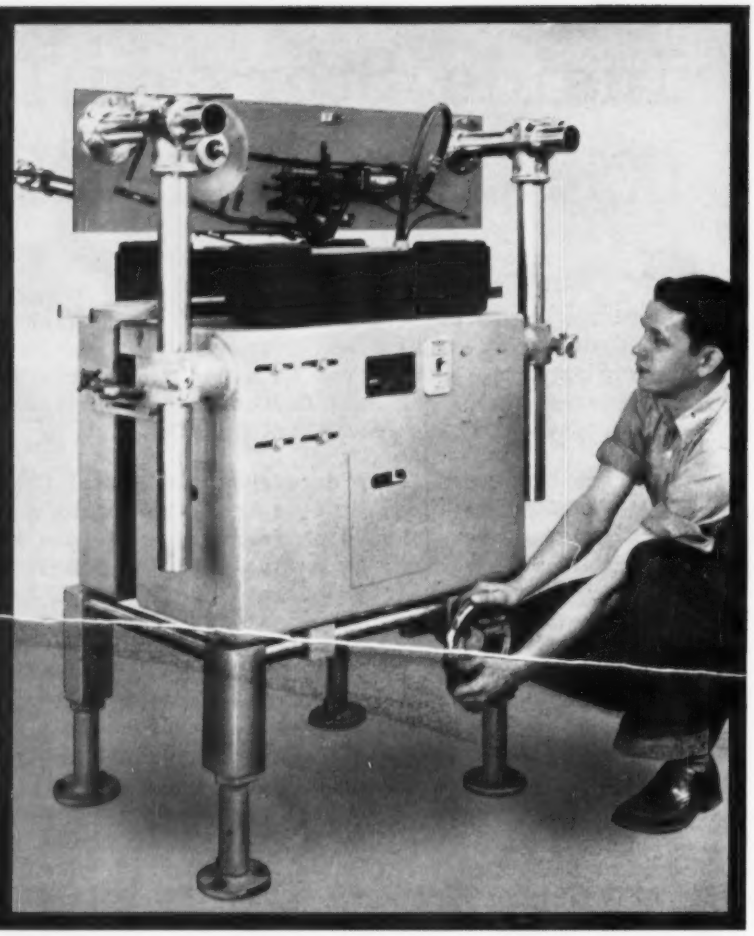
BRONZE, IRON, STEEL AND CORROSION RESISTANT VALVES



For more data, circle this page number on card at back →

UP TO 220 OUTSERTS PER MINUTE attached automatically—expensive hand labor eliminated. Pfaudler Outserter handles cylindrical containers of tin, plastic, glass or paper 2⅜" to 7¼" in length; 1¼" to 6½" O.D. Machines are also available for other sizes and shapes.

PUTS OUTSERT WHERE YOU WANT IT. Whether a recipe, contest rules, premium offer or what, the Pfaudler Outserter attaches the message precisely where you want it, then passes container along to casing machine.



# Here's how you can move your product faster

## *Apply sales messages to your package automatically—economically*

Now—you can give *your* package a fast push into the shopper's cart—inexpensively!

Here's a machine that applies up to 220 point-of-sale attachments per minute—*automatically*. The Pfaudler Outserter completely eliminates hand labor—pays for itself *quickly!*

But even more important, your products sell better. For example, one user reports that before they began using the Pfaudler Outserter in 1953, sales were down from the previous year 20%. In 1954, using outserts, sales increased 10%; in 1955, an additional 19%; and so far this year, 15%. This was all accomplished *without* extra advertising support!

This simply illustrates what smart merchandisers already know. Give purchasers ideas about the use of your products and they will use more of them. But make it easy. Now that the cost of doing the outserting job is no longer a factor, why not let Pfaudler sales engineers show you how you can use the Pfaudler Outserter to advantage in your business. You can attach recipes, contest rules, premium offers, etc., automatically to cylindrical packages of any material. Call your nearest Pfaudler office or send us a sample container and indicate where the outsert should be attached. We'll be glad to give you all the facts.

**THE PFAUDLER CO.** Pfaudler **Rochester 3, New York**

**See new Pfaudler Outserter in operation at the Canners' Show**

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**PROCESSING PROBLEMS — PRODUCT DEVELOPMENT — MARKET RESEARCH — PLANT LAYOUT and DESIGN — PACKAGE DESIGN and TESTING MANAGEMENT — PUBLIC RELATIONS — GENERAL CONSULTING — PATENTS — CHEMICAL, BACTERIOLOGICAL and NUTRITIONAL ANALYSIS**

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*Registered Professional Engineers*
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Specializing in:
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of Construction, Installation and Start-Up.
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Consultation on Food Problems
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SENSORY PANEL TESTS
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FLAVOR EVALUATION
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Services in biochemistry, nutrition, food technology, microbiology, food inspection and analysis, toxicology, and insecticide testing.
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*"By reason of special training, wide experience and tested ability, coupled with professional integrity, the consulting engineer brings to his client detached engineering and economic advice that rises above local limitations and encompasses the availability of all modern developments in the fields where he practices as an expert. His services, which do not replace but supplement and broaden those of regularly employed personnel, are justified on the ground that he saves his client more than he costs him."*

# WHERE TO

- **STORE** Frozen Foods
- **BUY** Ingredients, Equipment, Parts, Services

**CARROT OIL makes food golden yellow**

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A activity. Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A activity of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

**SEND FOR BOOKLET**

New 36-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals. Important reading for most food processors. Write today!

**NUTRITIONAL RESEARCH ASSOCIATES**
**205 Broad St., South Whitley, Ind.**

**QUAKER CITY COLD STORAGE CO., INC.**
**PHILADELPHIA, PA.**
**3 WAREHOUSE LOCATIONS**
***Proper Temperature for Frozen Foods***

***the advertisements on the following pages***

*are live opportunities in the field of food processing and distribution.*

*Each announcement represents a current Want or Offering of an organization or individual in the field, with some element of profit in each for whoever can fill the need. Some have money-saving possibilities, others are opportunities for more business; many are employment opportunities; still others offer property, or equipment—used or surplus new equipment.*

*"Searchlight" advertisements are constantly changing. New opportunities are constantly finding their way into this great Want medium, each issue. Regular reading of the "Searchlight" pages can be as important to you as reading the editorial sections; Editorial matter is NEWS OF OPPORTUNITIES offered in the industry.*

**for EVERY business WANT**
**"Think SEARCHLIGHT first"**

# EMPLOYMENT OPPORTUNITIES

The Advertisements in this section include all employment opportunities—executive, management, technical, selling, office, skilled, manual, etc.

**Positions Vacant**
**Positions Wanted**
**Part Time Work**

**Civil Service Opportunities**
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The advertising rate is $18.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

**An advertising inch** is measured ⅞" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

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February Issue closes January 18th.

## ENGINEERS SALES

Are you interested in a Sales Promotion and Engineering career in the field of Instrumentation and Automation?

If you are a graduate M.E., E.E., Ch.E., or Food Technologist, with, say, 3 to 5 years industrial experience in food processing, or food equipment selling, we invite you to apply for a position in our Food Industries Division at Foxboro. Occasional travel will be required. Sales aptitude tests are provided at our expense, as is a thorough training course to the successful applicant.

There's a real opportunity here for the right man. If you feel you are that man, please write—outlining education and experience—to

**Wendell S. Young**

**THE FOXBORO COMPANY**

**Foxboro, Massachusetts**

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**PROJECT ENGINEER**—B.S.M.E. Approximately 6-10 years experience. Design, installation, and testing of processing and materials handling equipment and machinery.

**PACKAGING ENGINEER**—B.S.M.E. desirable, not essential. 3-5 years experience in container manufacturing and filling, and associated equipment.

**METHODS ENGINEER**—B.S.M.E. Experience in time study and methods.

Please send detailed resume

**CAMPBELL SOUP COMPANY**
**100 Market Street**
**Camden 1, New Jersey**

*Experienced*

## Food Technologist-Chemist

**Sales Position—working with the food industries on new products and product improvements.**

**Excellent opportunity for an experienced food technologist, food or cereal chemist.**

**All replies confidential.**

**Mr. P. W. Bauman**

**MONSANTO CHEMICAL CO.**
**710 N. 12th Blvd. St. Louis (1) Missouri**

### SOUTH AMERICAN SUPERVISORY POSITIONS

**Large food processing corporation requires services young men for supervisory positions in South America. Must have meat packing plant experience; prefer college education or equivalent.**

P-3850, Food Engineering,
520 N. Michigan Ave., Chicago 11, Ill.

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**General Offices of large national multi-plant food processing corporation located in Eastern United States requires an outstanding young Product Research Chemist of the highest professional and personal qualifications. Requires advanced degree or food industry experience in the development of new products and the improvement of existing products.**

**P-3871**, Food Engineering,
Class. Adv. Div. P.O. Box 12, N.Y. 36, N.Y.

### WE NEED

**FOOD TECHNOLOGISTS and FOOD CANNNING CANDIDATES —junior to top-level**

**Call, write or wire:**
**Gladys Hunting (Consultant)**
**Drake Personnel, Inc.**
**220 S. State St., Chicago 4, Ill.**
**HArrison 7-8600**

*REPLIES (Box No.): Address to office nearest you c/o This publication Classified Adv. Div.*
*NEW YORK: P. O. Box 12 (36)*
*CHICAGO: 520 N. Michigan Ave. (11)*
*SAN FRANCISCO: 68 Post St. (4)*

### *EMPLOYMENT SERVICE*

**Salaried Personnel. $5,000-$30,000.** This confidential service established 1927 is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F., P. O. Box 674, Manchester, Vermont.

### *POSITION WANTED*

**Food Processor and Businessman—28 years** experience in managing large fruit processing plants in Europe and America. Chemist and technologist, able to build, technically and commercially manage large plant. With excellent marketing connections. Specialist in apple industry (canned apples, juice, concentrate, esters, pectin). Seeks responsible position from July 1, 1957. PW-3715, Food Engineering.

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When there are many applicants for a single position it frequently happens that the only letters acknowledged are those of the most promising candidates. Others may not receive any indication that their letters have even been received by a prospective employer much less given consideration. These men often become discouraged, will not respond to future advertisements, and sometimes question their bona fide character.

*Every advertisement printed in the Employment Opportunities Section is duly authorized.*

It will help to keep our readers interested in this advertising if you will acknowledge every application received, even if you merely return the letters of unsuccessful applicants with, "Position filled, thank you" written or stamped on them. If you don't care to reveal your identity, mail them in plain envelopes.

We suggest this in a spirit of cooperation between employers and the men replying to Positions Vacant advertisements.

*Classified Advertising Division*

**McGraw-Hill Publishing Co., Inc.**

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The following Equipment comes out of one Plant —all in perfect condition ready to put into operation.

# 35 Stainless Steel continuous Instant Fondant Machine.
# 36 # 1 M & S Filler—Bronze Pistons, Complete.
# 37 # 2 M & S Filler—Bronze Pistons, Stainless Steel Hopper Complete.
# 40 Stainless Steel Link Belt Conveyor.
# 45 Standard Knapp Glueing Compression Unit.
# 47 Union Heavy Duty Bag Sewing Machine on Column.
# 143 Langsenkamp # 144 Pulper complete on Stand.
# 145 # 10 M & S All Stainless Steel Filler with Agitator.
# 153 3 Can Twisters 300 x 200—309 x 409—401 x 411.
# 201 6 Stainless Steel Dripless Exhaust Hoods.
# 239 New Bellamy Automatic Labler, 150 per M.
# 250 Geyer Stainless Steel 8 Pocket Filler, 160 P. M.
# 254 CRI Continental Can Closer 250 P. M.
# 259 Continental Flange Straightener # 10—300—307
# 260 Set Code Dies for Continental Closer.
# 277 Replstan 16¾ Inch. Power Belt Conveyor.

Write or Wire for Details and Prices.

**F. W. HUBER MACHINERY CORP.**

461 Broome Street — New York 13, N. Y.

## 2—#98C AMS DOUBLE SEAM CAN CLOSING MACHINES, air operated, cap.: 2" to 6⅝" dia. x 2" to 8⅞" high; excellent condition.

H. H. PELZ MACHINERY CO.
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## DRYING OVEN FOR SALE

Gas fired—hot air circulating oven. Temperatures to 525 F. 40' long by 5' wide. Continuous stainless steel mesh conveyor belt—variable speed. Can be used for drying, baking, etc. Currently in use. Reasonably priced.

"Inspection by Appointment"

MIDLAND PRODUCTS CO. — HO 1-7730
1318 S. Canal St. — Chicago 16, Ill.

*FOR SALE AT SPECIAL PRICES*

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Available for immediate erection. Complete with refrigeration equipment for zero degrees. Armorply surfaces. Fiberglass, 3 and 4 years old. Very low price.

James A. Mixon and Company
11212 Grandview Avenue, Silver Spring, Maryland

## WANTED
## A USED FILTER

suitable for filtering pure maple syrup. Price important factor.

CHURCHILL'S MAPLES
JEFFERSON, NEW YORK

*BUSINESS OPPORTUNITY*

**Important company seeks license for manu**facturing in France continuous filters for sugar refineries and distilleries (sugar beet). Write: Provalex, 45 Bd. de la Gare, Paris.

## LOEB OFFERINGS

Cappers Capem, Titecap, Swanson, U. S. automatic and semi-automatic.
Centrifugals: Fletcher 12" copper, 20" lith-coated, Tolhurst 26" copper, 26" rubber.
Clarifiers: De Laval model 84-51.
Compressor, Freon: Carrier 25/12½ hp.
Cutter, Bone: Wausau, 5 hp.
Cutters, silent: Buffalo 32" and 43".
Dryer: Devine 2 x 4' vac. drum, st. steel.
Dryer: Bowen lab. spray, st. steel.
Dryer: Direct Heat 4' x 20'.
Dryer: Stokes rotary vacuum 2½ x 8'.
Extractor: Troy 26" monel basket.
Fillers, liquid: Peerless 6 valve, Cass gross weight, siphon and vac. types.
Fillers, piston: Stokes, Colton, Elgin, Filler Machine Co. for jars, tubes.
Fillers: M & S for cans 6 and 10 pocket, st. st.
Fillers, powder: Speedee, Triangle, Stokes & Smith, Ferguson, Gump.
Filter Presses: Sperry, Shriver 6"-36", recessed and plate and frames types.
Filters: Int. pressure—Alsop, Sparkler, Lomax, Industrial, Sweetland.
Filter, vacuum: Oliver 2½ x 1'.
Homogenizer: 2-1200 GPH. Union, 300 GPH. Union, 125 and 400 GPH. Gaulin.
Kettle: Dopp 150 gal., jkt., agitated.
Kettles, Stainless steel: 5 to 300 gal., with and without agitators.
Aluminum 40 to 100 gal.
Labelers: Burt, Knapp, New Jersey, World, Ermold—auto and semi-auto.
Mills, hammer: Mikro, 2DH, 2TH, Gump #1, Prater, Raymond, Jay Bee, Jeffrey 30 x 24". Williams #2 and BX.
Colloid: Charlotte st. steel 1 hp., iron 25 hp.
Mixers: Dough type single and double arm, 5 to 100 gal.
Powder: 50 to 2000 lb. capacity.
Portable Electric: ¼ to 5 hp.
Gemco 5' x 14" st. steel.
Pasteurizer: Wallace-Walker plate type, 200 GPH, st. steel.
Pumps: Centrifugal, rotary, gear, vacuum, all types and sizes.
Screens: Rotex 20 x 48", 42 x 84', 18 x 50", Selectro 4 x 10' Abbe Blutergess #1.
Sealers, carton: Ceco, Triangle, Packomatic.
Separator: De Laval Nozzle-Matic AC VO.
Sterilizers: Climax 20" x 36" jacketed.
Still, water: Barnstead 75 gal.
Tablet Presses: Single punch and rotary.
Tanks: Glass lined, various sizes.
Stain. steel 25 gal. to 1200 gal.
3—6000 gal. insulated, agitated.

*Send us your inquiries and list of idle equipment*

## LOEB EQUIPMENT SUPPLY CO.

820 West Superior St. — Chicago 22, Ill.
Telephone Seeley 8-1431 — Our 32nd Year

**FOR SALE**

40 H.P. Cleaver Brooks Boiler, Oil Fired.
3200 gal. S.S. Truck Tank & Trailer.
Tubular Heat Exchanger, 24—1"x10' S.S. Tubes.
100 to 400 gal. S.S. Mix Tanks, water jkt.
250 gal. Vert. S.S. Tank, insul., agit.
330 gal. S.S Tank, 45"x48", side agit.
500 gal. S.S. Tank, 50"x84", insul.
500 gal. Pfaudler G.L. Tank, Jkt., T.C. Coil.
36" & 60" S.S. Vacuum Pans.
125 to 1500 gal. Homogenizers or Viscolizers.
3000 gal. Horiz. Glass Lined Tanks, agit.
Hope Two Plunger Filler.
50 gal. S.S. Premixer (Tank), side agit.
Little Giant Ice Breaker, 1 H.P.
Baltimore Aircoil Water Cooling Tower, 90 G. P. M.
Hobart Grinder, 1½ H.P.
Milk Pasteurizers, Coolers, Fillers, Washers.

*Send us your inquiries*

LESTER KEHOE MACHINERY CORP.
1 East 42nd Street — New York 17, N. Y.
Murray Hill 2-4616

## FOR SALE FROM STOCK

- Urschel Model B and Sterling Dicers
- FMC Hand Pack Fillers
- World and Pony semi automatic Labelers
- Burt and Standard Knapp Labelers
- CRCO model R-1 Relish Cutter
- Pressure type Retorts, all sizes
- Perforated and slatted Retort Crates
- Boutell Apple Peelers and Slicers
- Bean Soaking Tanks—50" diameter and 66" high
- Karl Kiefer Bottle Rinser
- Elgin, Kramer and Kinex Screw Cappers

*"Write for complete bulletin of used and reconditioned equipment. Mail us a list of your surplus equipment today."*

Food Processing Equipment Co.
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Phone: FI-3-2579

## JANUARY SPECIALS

Retorts Horiz. & Vert. All makes & sizes
Pfaudler 100 gal. SS agitated kettle
Piston fillers 1-2-4-6 & 8 spouts.
FMC Hand Packed SS Filler # MH1608
316 SS Single Drum 3' x 5' Dryer, 5 H.P.
MRM 12 spt. SS Straight Line Vac. Filler
Biner Ellison Model 16-Q Filamatic
World Twin Turret Labeler, 120 per minute
Capem SIF Automatic Capper, up to 88mm
3 Pony Labelers, 86MXX, 86ML & 86MX
3 Rotex Sifters 20" x 48" & 40" x 84"
Wrap Around Labelers. All Makes & Sizes

**NEW—STEEL S/S MIXERS, KETTLES & TANKS. Fabricated to Your Specifications. Engineering Advice Available.**

*We Buy Complete Plants or Single Units*
*What Have You For Sale?*

YOU CAN BANK ON

## EQUIPMENT CLEARING HOUSE, INC.

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SOuth 8-4451—4452—8782

**FOR SALE**

30" Copper Coating Pans with stem coils
300 gal. Copper Still with condenser and tank
100 qt. 3 speed Read Master Mixer
80 qt. M-80 4-speed Hobart Mixer
100 gal. Copper Steam Jacketed Mixing Kettle
York Freon Compressor with 1½ HP 3 phase motor
Burns Split Nut Peanut Blancher

SAVAGE BROS. CO.
2636 Gladys Ave. — Chicago 12, Ill.

## FOR SALE

2—Pneu. Scale 6 head capper, 53 mm.
3—Bird T316 St. St Continuous Centrifugals, 32" x 50", 40" x 60".
2—Filler Machine Co., 4 cyl. St. St. piston fillers.
1—Niagara type 316 S. S. Pressure Filter, model 510-28, 500 sq. ft.
10—Shriver & Sperry Filter Presses.
5—Double Drum Dryers: 42" x 100", 32" x 52", 24" x 36".
7—Vacuum Shelf Dryers: 55 to 475 sq. ft.
2—Spray Dryers: Lab 19'D.
2—Rotary Steam Tube Dryers, 4' x 30'; 6' x 30'.
1—Stokes St. St. 150 gal. Jacketed Vacuum Still.
1—Buflovak #6.5 St. St. Double Effect Evaporator, suitable for Whey.
1—Stokes Type 316 St. St. Double Effect Evaporator, 250 GPH.
1—Conkey Triple Effect Evap. Silicon Bronze, 1900 sq. ft.—UNUSED.
3—Fitzpatrick Comminutors, St. St. models D, F & K.
3—Pfaudler Glass lined jacketed Reactors, 300-500 gal.
2—125 gal. St. St. Jacketed Kettles, Scraper Agit.
3—Mikro Pulverizers—#2-TH, #3-TH.
4—Mixers St. St. Double Arm, 5, 50, 75, 200 gal.
2—St. St. Selectro Screens, 2' x 7', two-deck, enclosed.
1—3590 gal. Stainless Steel single axle Truck Tank.
30—Stainless Steel Tanks—30 gal. to 10,000 gal. sizes.
3—Vacuum Pans, St. St., 6' dia.; with coils.
75—Welded Steel Tanks—Brewery lining.

BOTTLING CANNING MACHINERY PERRY SUPPLIES PROCESSING

**PERRY EQUIPMENT CORP.**

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**EXTRA SPECIAL**

**PFAUDLER PISTON FILLER**

- Model R.P. 14
- All Stainless contact
- New 1953
- Excellent Condition.

***MACHINERY AND EQUIPMENT CO.***

514 Bryant Street San Francisco, Calif.

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**FOR SALE**

DOUBLE DRUM DRYERS:
Two—42" x 90" in West.
Two—42" x 100" in Midwest.
Two—32" x 120" in Midwest.
One—24" x 36" in Midwest.

S/S TANKS: Two 700 gal. and one 3,000 gal. vertical, sanitary, dished tops and bottoms.

S/S TANKS: 2,700 gal. and 3,250 gal. sanitary, horizontal, insulated.

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HEAT EXCHANGERS: Three plate type, S/S sanitary creamery package and Cherry Burrell makes. 31 to 75 plates each.

S/S TWO EFFECT EVAPORATOR 1025 sq. ft.

**BEST EQUIPMENT COMPANY, INC.**
1737 W. Howard Street Chicago 26, Illinois
*Ambassador 2-1452*

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**A BRILL BUY**
**. . . IS THE BEST BUY**

*SPECIALS*

5—Bird 32"x56" 316 S.S. Solid Bowl, Continuous Centrifuges.
2—Bird 24"x38", 18"x28", 304 S.S. Solid Bowl, Continuous Centrifuges.
2—Bird 40" Suspended Type Centrifugals, 347 S.S.
2—500 gal., 347 S.S. jacketed Autoclaves, 300 psi internal, 75# jacket.
1—Struthers-Wells 375 sq. ft., single effect Evaporator, 316 S.S.
1—Niagara #230-32 Pressure Filter 304 S.S., 230 sq. ft.
2—Sperry 30" Heresite coated P&F Filter Presses.
2—Baker Perkins 100 and 50 gal., 316 S.S. Sigma Blade, jacketed Mixers.
1—I.R. 208 ton Jet Refrigeration Unit.
1—Buflovak 32x120" Double Drum Dryer.
1—Link Belt 5'2" x 20' Steel Roto-Louvre Dryer.
1—Hersey 18"x12' Hot Air Rotary Dryer, 304 S.S.
4—Sweetland Filters #3, #5, #7, #12.
4—Day "Cincinnatus" Sigma Blade Mixers, 200 and 100 gal.
1—#2TH Mikro Pulverizer, 7½ HP motor.

**BRILL EQUIPMENT COMPANY**

2401 Third Ave., New York 51, N. Y.
OR
4101 San Jacinto, Houston 4, Texas

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*SPECIAL OFFERINGS*

**Modern Packaging Equipment**

KARL KIEFER 24 Head Fully Automatic, Stainless Steel Vacuum Fillers.

CAPEM 4 and 3 Head Fully Automatic Cappers.

*The above machines are in practically new condition.*

PNEUMATIC SCALE COMPANY Cartoning Line, Consisting of: Automatic Feeder, Bottom Sealer, Filler, Top Sealer & Compression Unit.

PNEUMATIC SCALE COMPANY Tightwraps, High Speed.

PNEUMATIC SCALE COMPANY, WORLD and PONY fully automatic and semi-automatic Labelers, 60-120 per minute.

STOKES & SMITH Model D Neverstop.

STOKES & SMITH Model H.G. 84, G, and GD Auger Fillers.

STOKESWRAP Model A with electric eye, counter, stainless steel auger filler.

PACKAGE MACHINERY CO Model FA & FA2 Wrappers.

*Partial List— send for complete list of equipment in stock.*

**JUST RECEIVED**

**Pneumatic Scale Company**
**120 Per Minute Bottling Line**
consisting of Bottle Cleaner, Stainless Steel Filler, 4 Head Rotary Capper and Duplex Labeler. Above unit Five years old.

**ALLIED EQUIPMENT CO.**
940-946 Nepperhan Ave., Yonkers 3, N. Y.
Phone: Yonkers 5-0442

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**HI-PRESSURE**
Complete stock from 10-2,000 h.p.
Nation's largest inventory, New & Used

**WABASH POWER EQUIPMENT**
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**STAINLESS STEEL DRYER**

1—Rotary Dryer, Stainless Steel, 30"x18'—with lifting flights and motor drive.

**THE MACHINERY & EQUIPMENT CORP.**
293 Frelinghuysen Ave., Newark 12, N. J.
*TAlbot 4-2050*

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**50 new Lightnin' Portable Agitators**

Model 11, stainless steel shaft and propellors mounted on brushed aluminum stand; 23" high, base 9" wide, 16" long; complete with 3 gallon container.

Cost new $120.00; offered $60.00, each in original carton. Photographs sent upon request.

**ACE PROCESSING EQUIPMENT CO.**
6823 S. Kenwood Ave., Chicago 37, Illinois

**UNION**
Rebuilt Machinery
Established 1912

# MODERN REBUILT PROCESS MACHINERY

## At Terrific Savings

### MIXERS

Baker Perkins 16-RNM2 150 gal. Steam Jacketed Mixers, Vacuum Dome, Cored Jacketed Sigma Blades.
Baker Perkins 50 gal. Steel and Stainless Steel Steam Jacketed Double Arm Mixers.
Day 12, 20, 50, 75, 100, 150 gal. Double Arm Mixers, Cincinnatus and Imperial.
J. H. Day 50 to 10,000 lb. Steel, Wood and Enamel Powder Mixers.
Gemco 30 cu. ft. Vacuum Double Cone Blender.
3500 gallon working capacity Steam Jacketed Double Arm Mixing Tanks.

### FILLERS & CAPPERS

Triangle Package Models U1, A3, A1C, G2C, A6CA Elec-Tri-Pak Fillers.
S. & S. G1, G2, HG84 Auger Fillers.
Filler, Hope, Elgin S. S. Piston Fillers.
Elgin 24-Head Rotary Vacuum Filler.
Resina LC Automatic Capper.
Capem 1 Head and 4 Head Cappers.

### WRAPPERS

Hayssen, Package Machy. Co. FA, FA4, DF, CA2, Miller, Scandia and Oliver Automatic Cellophane Wrappers.
Hudson Sharp Campbell Automatic Wrappers, Models 2W6, 2W8, and 2W10.
Forgrove Modwel 26D Foil Wrapper with underneath fold and adjustable jaws.
Standard-Knapp No. 429 Carton Sealer.
Doughboy, Amsco and Pack Rite Automatic Rotary Bag Sealers.

### LABELERS

CRCO Nu-way, Burt and Knapp Adjustable Wraparound Labelers.
Pony M, and ML and TO (Thermoplastic) Labelrites.

### MISCELLANEOUS

Sanders 20 HP Meat or Fruit Grinder.
Brown PFM Automatic Bag Filling Machine.
Fitzpatrick "D" S. S. Comminuter.
Mikro 4TH, 3TH, 3W, 2TH, 1SH Pulverizers.
Charlotte 3 HP Colloid Mill.
Stokes DD2 and RBB Tablet Machines.
Colton 2RP, 3RP Rotary Tablet Machines.

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*Write, Wire, Phone For Details and Prices*
*Act Now For Choice Selection*

**TOP PRICES PAID FOR YOUR SURPLUS EQUIPMENT**

## UNION STANDARD EQUIPMENT CO.

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New York 12, New York
*Phone: Canal 6-5334*



**FMC**

## Choice Equipment for the Food Industries . . in Stock for Immediate Shipment

NEW FALCON Ribbon Blenders or Mixers in Mild or Stainless Steel; all sizes
NEW Stainless Steel Steam Jacketed Kettles and Tanks; all sizes
Special Lot of Stainless Clad Kettles; Steam Jacketed; 80 gal. capacity
Copper Kettles up to 250 Gal.; Glass Lined to 300 Gal.; Aluminum to 80 Gal.
VACUUM PANS: Pfaudler Glass Lined, 500 and 1000 Gal.; Aluminum or Copper 250 Gal.
Sterilizers: 48"x42"x96"; 36"x42"x84"; Ft. Wayne 61"x126"; others
Double Drum Dryers: 32"x72"; 42"x100"; Twin Dryers 42"x120"
Buffalo Chrome Plated Flaker: 12"x18" complete with accessories
Food Machinery Corp. Retorts: Standard 42"x72" Vertical
Devine No. 23 Double Door Vacuum Shelf Dryer: 57"x78" shelves; complete
Stokes No. 138B Vavuum Shelf Dryer: Shelves are 24"x24"; complete
Anderson Oil Expeller Model "Red Lion" with 15 HP. motor and accessories
Anderson Oil Expeller Type "RB" with 25 HP motor and accessories
American Utensil (CRCO) Model "B" Juice Extractor with 5 HP Motor
Manton Gaulin Stainless Steel Homogenizer Type 125 CGC
A. T. Case Stainless Steel S 50 Homogenizer with 15 HP Motor
Charlotte Model 50 Colloid Mill in Monel
DICERS by Sterling and Anderson; Rotary Cutters by Abbe, Ball & Jewell, Munson
Sterling and Blakeslee Potato Peelers: Various sizes; Coffee & Meat Grinders
Robinson and Bauer Double Runner Attrition Mills: 24" and 18" with 2 Motors
Hammer Mills, Grinders, Crushers by Williams, Gruendler, Jay Bee, Mikro etc.
Sprout Waldron 2 Pair High Roller Mill: 9"x18"; Robinson Unique 4 Roll 7"x24"
SIFTERS: Witte, S.S. 21"x101"; Rotex 30"x60"; Patterson Gyro 3 Deck 20"x84"
Robinson Unique S.S. 20"x70"; Ajax Vibratory in S.S. 18"x48"
Robinson Gyro Double Deck 20"x90"; Selectro 18"x48" & 24"x84"
J. H. Day Egg Clipper Mixers: 20"x22"x28 and 32"x32"x25"
Savage Marshmallow Beater: 200 lb. Capacity; arranged for M.D.
FILLERS: Stokes & Smith Powder Fillers, Semi and Automatic Models
Triangle Electri-Pak 4 Station Conveyor Type Filler
Gump Bar-Num Vibrox Barrel Packers
Berlin Chapman Syruper Type Liquid Filler up to 60 3 Cans
Berlin Chapman Stainless Steeel 7 Spout Filler up to No. 10's
Horix Stainless Steel 14 Stem Gravity-Vacuum Fillers up to qts.
Karl Kiefer 2 Stream Vari Visco Filler for Liquids and Semi-Liquids
Karl Kiefer Rotary Vacuum Fillers with 12, 16 and 18 Stations
LABELERS: Can Labelers by Standard Knapp, Burt, Kyler, Nu-Method and others
Bottle Labelers by New Jersey, World, Ermold, Pneumatic Scale, others.
Piston Fillers from 1 to 11 Pistons, by Elgin Filler M Co., Bridge, etc.
M. & S. Stainless Steel 10 Pocket Hi Speed Fillers for small cans
CAPPERS: Pneumatic Scale 4 Head Automatic Capper; Capem 4 Head Model B2F
Johnson Automatic Wrapper for Frozen Food Packages; adjustable within limits
Standard Knapp Automatic Gluer & Sealer No. 429-600 Series complete
SPECIAL AGITATORS at less than Half Price: Top Entering 5 HP S.S. 240 RPM

**The above list represents only the more important units; if you do not see listed the item you need, do not hesitate to send us your inquiry.**

***SEND US YOUR LIST OF SURPLUS EQUIPMENT***

## FIRST MACHINERY CORP.

**209-289 TENTH STREET, BROOKLYN 15, N. Y.**
**PARKING ON THE PREMISES**
**PHONE: STerling 8-4672**

FRED FIRSTENBERG
*President*

Cable "EFFEMCY"



# BARGAINS FOR SALE

The RUDERMAN MACHINERY EXCHANGE of Gouverneur, N. Y., one of the largest diversified Machinery & Equipment Dealers in America, can furnish you with practically all your needs in Modern Ice Cream, Milk Plant and Electrical Equipment at but a fraction of the original cost.

*Among the hundreds of items in stock are included the following:*

**Storage and Holding Tanks of all sizes**
**Filters**
**Homogenizers**
**Pasteurizers**
**Coolers including Sweet Water Coolers**
**Freezers**
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**Refrigeration**
**Univats**
**Slicers and Slicing Machinery**
**Fruit Strainers**
**Kettles**
**Whippers**
**Nut Choppers and Grinders**
**Molds**
**Variegaters**
**Baggers and Bagging Machines**
**Bottle Washers**
**Cup Dispensers and Cappers**
**Wire Baskets**
**EDM Equipment**
**Scales**
**Slab Fillers**
**Thermometers and Recorders**
**S.S. Tables**
**S.S. Pumps of all types**
**S.S. Pipe and Fittings**
**Electric Motors and Gear Reducers of all sizes**

The above is but a small part of the inventory we carry. This machinery is all of modern type, mostly stainless steel.

**WRITE — WIRE — PHONE FOR YOUR NEEDS**

## RUDERMAN MACHINERY EXCHANGE

**GOUVERNEUR, NEW YORK** **Telephone: 333-334**

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# Using Salt Efficiently

by **INTERNATIONAL SALT COMPANY, INC.**—America's largest producer of salt

## How to Find the Strength of Salt Brines—Accurately

In most of today's plants, the type of hydrometer called a Salometer can generally be used to measure the strength of salt brines most accurately. This device (similar in principle to the hydrometer which checks the condition of your car's battery) is convenient to use—and its scale permits fast calculations for a variety of plant needs. The Salometer scale reads from 0° in pure water to 100° in saturated brine, with each degree representing a percentage of fully saturated brine.

Using the Salometer with maximum accuracy, however, isn't just a matter of reading the scale. A number of simple precautions must also be taken to make sure the Salometer records correct brine strength. Here they are:

**1. Check the temperature** of the brine. Since most Salometers are calibrated for reading at 60° F., brine temperature should be kept at this level during testing. When other brine temperatures are encountered, it is necessary to use the following table of simple correction factors. These will help provide a completely accurate measurement of brine strength.

### APPROXIMATE CORRECTION IN SALOMETER DEGREES

| Observed Salometer reading | Subtract per degree below 60° F. | Add per degree above 60° F. |
|---|---|---|
| 0 to 10 | 0.049 | 0.060 |
| 11 to 20 | 0.064 | 0.082 |
| 21 to 30 | 0.077 | 0.094 |
| 31 to 40 | 0.087 | 0.103 |
| 41 to 50 | 0.095 | 0.112 |
| 51 to 60 | 0.102 | 0.118 |
| 61 to 70 | 0.107 | 0.123 |
| 71 to 80 | 0.112 | 0.128 |
| 81 to 90 | 0.116 | 0.131 |
| 91 to 100 | 0.120 | 0.134 |

For measuring cold brines, such as those used in meat-packing plants, special 38° F. Salometers may be used. Special temperature-correction factors are available when using this type of Salometer to test brines above or below 38° F.

**2. Brine should be tested** only in a straight-walled cylinder made of clear glass—set on a level surface. Any moisture that collects on the outside of the cylinder should be wiped off before testing procedures start.

**3. Salometer stem must be thoroughly dry,** clean, and free from grease or caked salt crystals. Also, the Salometer should not touch the sides of the cylinder when readings are taken. It should be read with the stem in a vertical position.

**4. Check new Salometers** by placing them first in clear water; reading should be 0° S. Then empty the cylinder, rinse with a saturated salt solution, and refill with fully saturated brine; reading should be 100° S. Both water and brine should be at 60° F.

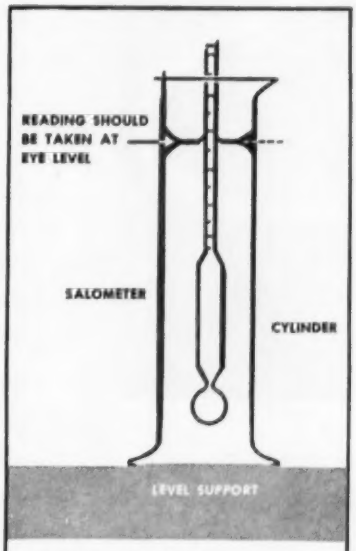


Illustration showing the proper eye level for reading a free-floating Salometer in a straight-walled glass cylinder.

**5. Correct reading technique.** Brine tends to rise along the sides of a glass cylinder, forming a concave surface known as a meniscus. For correct reading, the eye should be brought to a point level with the *bottom* of this meniscus. Errors of two or three degrees are possible if reading is taken at the point where the brine has risen along the sides of the cylinder.

**Special Salometers.** In the canning industry, where brine is used for quality grading, a different type of Salometer is often used. It's graduated on a scale where 100° S. represents brine containing 25% salt, instead of the normal 26.395%. Special hydrometers may also be used in the tanning or chemical industries. But the same procedures outlined here must always be followed when brine is to be tested—no matter what type of hydrometer a plant uses.

### TECHNICAL SERVICE WITH YOUR SALT

Through skilled and experienced "Salt Specialists," International can help you get greater efficiency and economy from the salt or brine you use. International produces both Sterling Evaporated and Sterling Rock Salt in all types and sizes. And we also make automatic dissolvers in metal or plastic for both kinds of salt. So we can recommend the type and size of salt most perfectly suited to your needs.

If you'd like help on any problem concerning salt or brine—or further information on testing brine strength—contact your nearest International sales office.

**International Salt Co., Scranton, Pa.**
*Sales Offices:* Atlanta, Ga.; Chicago, Ill.; New Orleans, La.; Baltimore, Md.; Boston, Mass.; Detroit, Mich.; St. Louis, Mo.; Newark, N. J.; Buffalo, N. Y.; New York, N. Y.; Cincinnati, Ohio; Cleveland, Ohio; Philadelphia, Pa.; Pittsburgh, Pa.; Richmond, Va.

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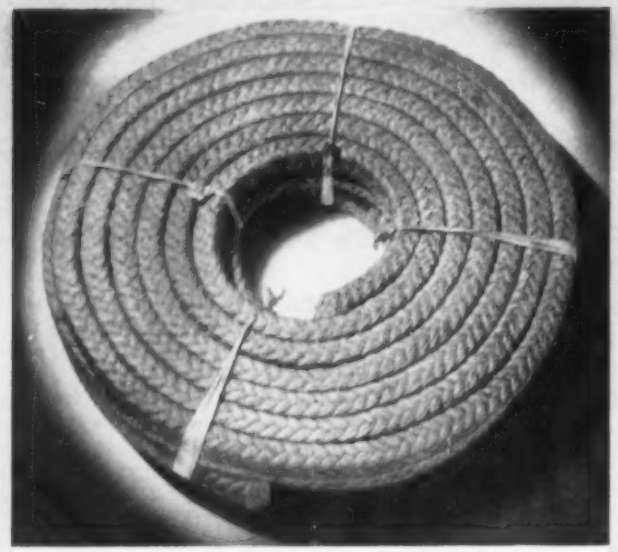

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FOR TEMPERATURES UP TO 150 DEGREES F.
U. S. Braided Teflon Packing (Style #135)
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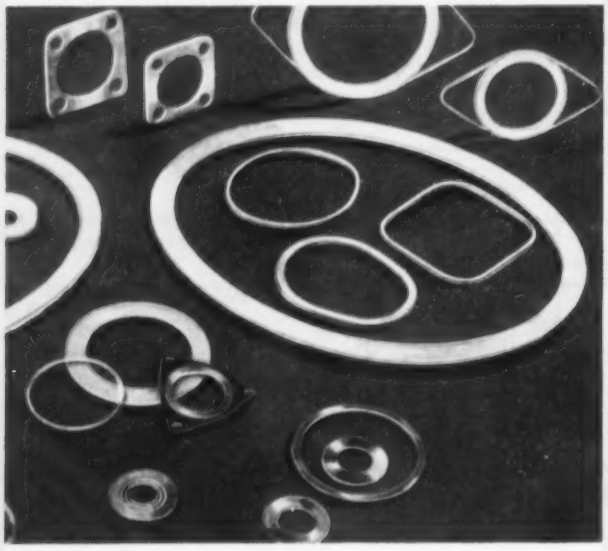

U. S. Teflon Gaskets
FOR TEMPERATURES UP TO 500 DEGREES F.

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Specify U. S. White Packings (Style #181) for temperatures up to 150 degrees F.

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These packings are available at any of the 27 strategically-located sales offices, or write United States Rubber, Mechanical Goods Division, Rockefeller Center, New York 20, New York.

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148b Steel

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176a Bul. 158

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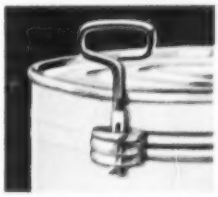
This ad will appear in LIFE, January 28, and SATURDAY EVENING POST, February 2.

# Look! "No-Stick" can ...ham slips right out!

## The finest container made for the finest hams sold... an AMERICAN can for AMERICAN hams!

Thanks to Canco research, something wonderful has happened to whole canned ham. *Now* the ham slips right out! No prying or shaking, no trouble at all. Busy housewives will be delighted with the convenience of this unique Canco container. What's more, this advanced "No-Stick" Can is also *much easier to open.* A new type tear-strip winds smoothly, never "spirals." This quality can is further proof that Canco is consistently first with containers that meet today's packaging needs!



*Much easier to open, too!*

*To be sure of this new convenience look for the oval on the can*

American Can Company



For more data, circle this page number on card at back →

# THE Sealva STORY OF "Sealed-In" Flavors

Some years ago, van Ameringen-Haebler, Inc. developed and introduced SEALVA Flavors, the first truly hermetically "sealed-in" high quality dry flavors. This new technique in flavor-making was immediately recognized and enthusiastically accepted by the food industry.

Since those early days, continuing improvements in sealing agents and drying techniques plus the basic superiority in the quality of the natural or imitation flavors themselves, have combined to maintain SEALVA's place as the ultimate in fully protected quality flavors.

### What can SEALVA do for your product?

The adoption of SEALVA Flavors makes possible the use of absolute top quality flavor in dry mixes, because the finest of flavors are fully protected in their powdered form against the ravages of deterioration caused by evaporation, oxidation, extended shelf-life, and they are practically impervious to chemical reaction with other ingredients in a mix or compound.

### Where can SEALVA Flavors be used to advantage?

SEALVA Flavors are ideal in any relatively dry, powdered, grained, or flaked mixture to insure inert flavor retention in such products as cake mixes, gelatin desserts, cereals, drink powders, pudding mixes, dairy mixes, ice cream mixes, candies (pressed wafer), pharmaceuticals, proprietaries, oil emulsions, etc.

For better flavor we ask you to investigate SEALVA Flavors before you make your final decision on this most important ingredient.

We are prepared to give you suggestions as to the methods of readily evaluating "sealed-in" flavors for your particular product and also will be happy to assist with technical recommendations for the application of SEALVA Flavors to improve your product. Literature and adequate samples are available.

Alva FLAVORS

VAN AMERINGEN-HAEBLER, INC.
521 WEST 57th STREET, NEW YORK 19, NEW YORK